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THE MAGAZINE FOR INFORMATION EXECUTIVES

FIRST OF TWO SECTIONS

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How To Survive A Disaster

Staying Afloat When
Calamity Strikes

PAGE 36

ALSO INSIDE

The Y2K Ripple
Effect

PAGE 28

IT Governance:
Ceding Control
Without Losing
Your Grip

PAGE 46

In the wake of a
freak flood, Allison
Manufacturing's
Glenn Wood knew
his options were
sink or swim

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Features

36 A River Runs Through IT

COVER STORY: DISASTER RECOVERY Your computer systems can be the lifeblood of your company. Here's how to make sure you'll be able to recoup your business if disaster strikes.

By Lucie Juneau Patrowicz

46 Can Federalism Fly?

I.T. GOVERNANCE Far-flung offices can crunch numbers as fast as headquarters, reviving the old conundrum of how tight IT should hold the reins.

By Christopher Koch

52 And Just IS for All

ELECTRONIC COMMERCE Several states accepted the challenge to bring the conveniences and efficiencies of today's technologies to their huddled masses. As a result, these "electronic governments" are creating new liberties.

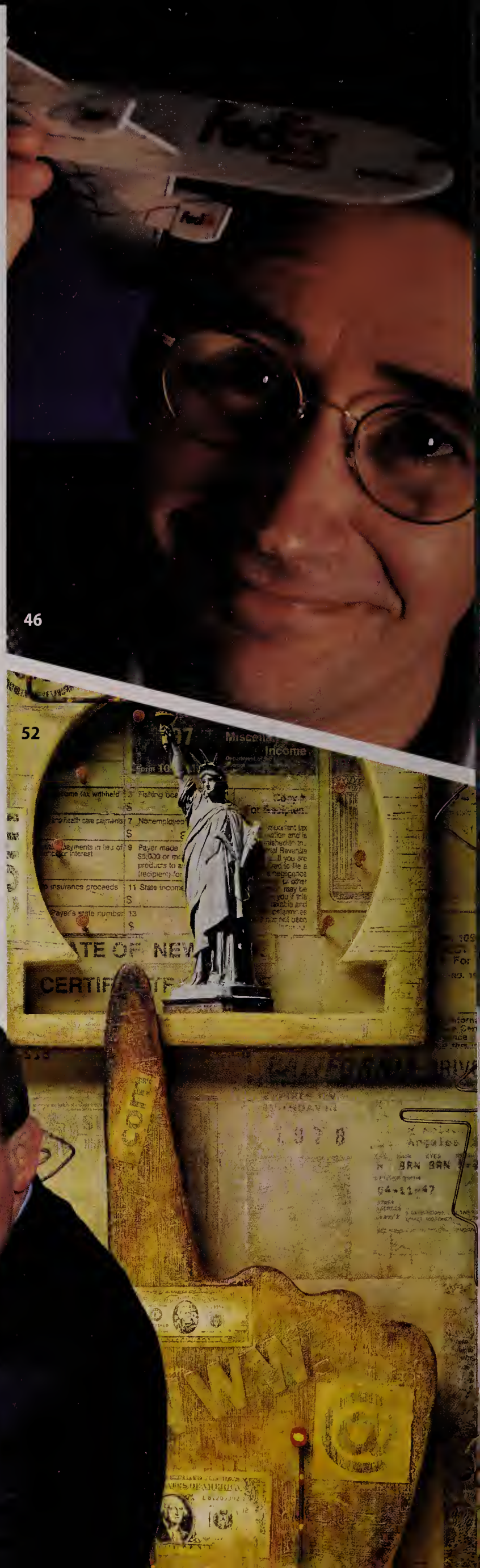
By Peter Fabris

ON THE COVER:

The right disaster recovery plan rescued Glenn Wood and Allison Manufacturing from troubled waters.

Cover photo by Brian Dressler / Liaison International

36



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ISV's is obvious:
run, don't walk,
to build on the
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**Paul Mason, Vice President,
Infrastructure Software Research, IDC**

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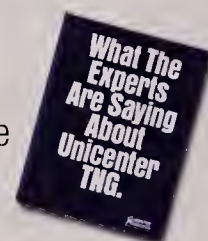
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Enterprise Value Awards application follows Page 6 of Section 2.



Columns

28 The Ripple Effect

YEAR 2000 CHALLENGE No one's immune to compliance problems.

By Scott Kirsner

58 Scanning from the Network

EMERGING TECHNOLOGY Playing from their strengths, two titans aim to simplify scanning.

By John Edwards

Year 2000 • T&E management
• Deployment software • Rubber bandwidth • Java productivity

68 Maine Employers Mutual Insurance Co.'s Gary Baxter

SHOP TALK The CIO of an insurance company talks about recruiting and retaining staff in remote locations.

By Tom Field



Inside Section 2

COVER STORY: INSIDE EXTRANETS

Harley-Davidson's extranet makes filing warranty claims, checking recall status and submitting financial statements as easy as cruising the open road.

INTERVIEW Ira C. Magaziner explains the Clinton administration's hands-off approach to Internet commerce.

MARKET RESEARCH Market studies of Web commerce may tell only half the story. But which half? Four business school professors suggest a few ways to find out.

NETREPRENEURS A Pulitzer Prize winner has a big idea: Sell good writing for small change.

THE MAIN ATTRACTION Want to know what visitors think of your Web site? Ask them.

GRAY MATTERS Web activists say information wants to be free. Federal law says much of it already is.

CUSTOMER INTERFACE Do Web-based 3-D tools have a place in the marketing department?

BY REDESIGN Freshness and functionality at Novell.

18

In Every Issue

10 In Box

Letter from the editor, reader feedback and how to reach us

14 Publisher's Note

18 Trendlines

The Lowdown on the High-Ups • Back to School • Getting Smart • To Catch a Cheat • Follow the Ants • Ten Years Ago in CIO

66 Index



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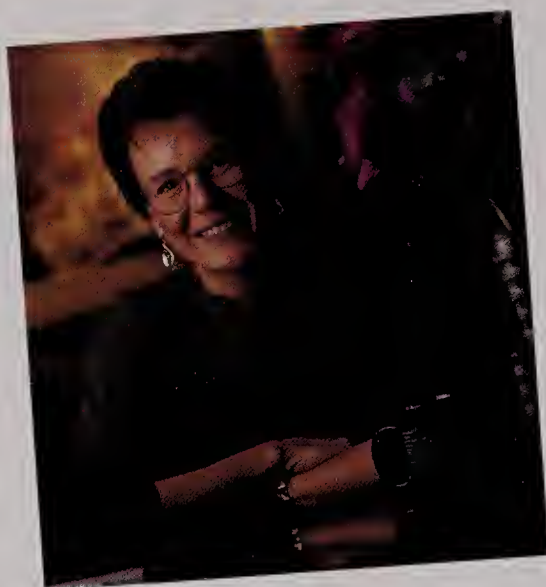
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In Box

LETTER FROM THE EDITOR, READER FEEDBACK
AND HOW TO REACH US

"We're all going to sink or swim together. The people who don't fix their problems will hurt the people who do."



-Skip Patterson
*Executive Director of the
Year 2000 Program Office
Bell Atlantic Corp.*

Never in the history of the world have the fates of people, companies and the economy been so inextricably linked. The year 2000 computer problem, more than anything else, exposes the weak underbelly of all this interconnectedness.

When I was growing up, my father taught me the principle of "numero uno." "You can't take care of anyone or anything else until you make sure you're

the best you can be," he told me. And he was absolutely right. But, as poet and theologian John Donne wrote in 1624, "No man [or company or economy] is an island." You need to make sure your company's systems are converted and tested for Y2K compliance, but you can't stop there.

Contributing Writer Scott Kirsner writes in "The Ripple Effect," beginning on Page 28, that there are six steps to ensuring the ripple doesn't swamp your boat: Take inventory of your outside exposures; investigate your suppliers', customers' and business partners' compliance; collaborate with them to help get their projects underway; track their progress on an ongoing basis; craft contingency plans should any of them fail to meet the deadline; and test and verify their systems with your own.

In other words, do whatever you can to ensure that key trading partners get with it. But be ready to cut your losses should they fail. If the organization in question is an important supplier, make sure you know who the alternate suppliers are and get to know them.

This attitude strikes me as one of the more fascinating aspects of this whole issue. On the one hand, you need to be concerned about what's going on beyond your own walls. It's not exactly altruism, but it is a broader view than most of us are used to. On the other hand, you must be prepared to dissociate from those you've been trying to help if you see that they're failing. It's kind of like native tribes casting out the weak and the infirm in order to survive.

These are interesting times indeed. It will take cool heads, firm resolve and a global view to make it through. And make no mistake: On this issue there's no going it alone.

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In Box

A MODEST PROPOSAL

I had a boss once who defined insanity for me. She said, "Insanity is doing the same thing over and over again while expecting different results." The majority of high-technology companies in Maryland and Virginia are insane! Every week they read articles in *CIO*, *Tech-Capital*, the *Voice of Technology* [a newsletter from the Northern Virginia Technology Council] or *The Washington Post*. All of them say the same thing: There are 19,000 job openings in Northern Virginia. Universities are not producing enough qualified people. We will have a need for 112,000 additional technology employees over the next five years—that's 1,800 per month.

Why are employers spending large amounts of money advertising in local newspapers and on the radio trying to find people who don't exist? Why are we spending advertising dollars to steal technology workers from a company across town or across the street? It goes something like this: While I'm stealing somebody from company A, company B is picking my pocket. All we are doing is needlessly raising the compensation

level of people in the area and reducing profit potential.

We have to add to the workforce. But how do we do that? Universities are under tremendous pressure to respond. However, they are not fixing the problem. It's getting worse. Fact: The number of bachelor degrees awarded in computer and information sciences has declined from a high of 42,000 in 1986 to just 24,500 in the academic year 1994, the latest year for which statistics are available [from the Department of Commerce's Office of Technology Policy].

The solution is right in front of our noses: Start an in-house technical university in your company. That's right, develop your own technology people. If you are hungry, plant some seeds, grow some crops and harvest your own future.

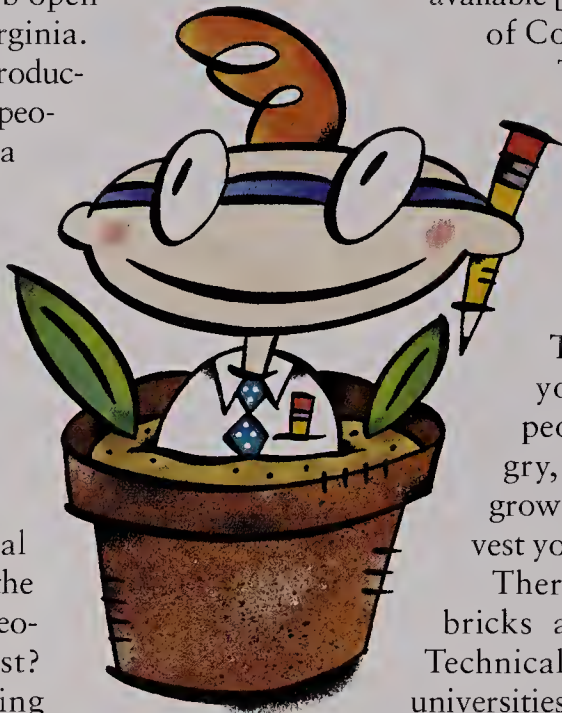
There is no need to use bricks and mortar today. Technical universities can be universities built in cyberspace, developed on existing enterprise servers and funded by what you're spending on advertising for people who don't exist.

There are companies out there that will help you develop training and certification programs for your employees. Hire bright people with degrees in math, music or the arts for less money and then spend an additional 10 percent to give them the technology skills they need. You will have loyal, dedicated employees who will take your company to the next level, and you will save money.

Let's do a story in *CIO* about how to develop a solution to the worker shortage instead of complaining about it. Let's show Silicon Valley and the tech folks in Boston that we can grow at a faster rate. All we need is the people. I say we grow our own. What do you say?

James A. Moran

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Publisher's Note

In 640 days, the Internet or its digital cousins—corporate intranets and extranets—could bring the global economy to its fiscal knees.

Here's why.

If you know the work of Bob Metcalfe, vice president of technology at IDG (a sister company to CIO Communications Inc.), you may have heard of Metcalfe's Law, which says that as a corporation connects any number (N) of digital devices to its network, (N squared) value accrues to the corporation.

It's simple and clean. More employees connected, more information shared. The network becomes more valuable as a corporate asset.



CIOs have long marched to the beat of Metcalfe's Law by connecting hundreds of millions of workers to local, wide area and corporate intranets. Economists often point to the networked economy as a major reason underscoring America's economic health.

In December 1996 many corporations shifted their focus to building expansive "extranets" that extended their companies' corporate intranet databases, applications and other information to networks built by their companies' customers, suppliers and partners.

Extranets, it was said, would lower the cost of producing and selling goods, cut out intermediaries, and improve customer service and satisfaction. For the most part, they do. But extranets change the dynamics of Metcalfe's Law.

The information superhighway is a double-edged sword. Companies committed to extending their information assets over the Internet—no matter how potent their firewall and/or data encryption policies—are more vulnerable to data corruption from others in the information food chain.

Particularly during the year 2000 crisis.

Every cola has an "uncola." The uncola of Metcalfe's Law is Beach's Law of Vulnerability: The number (N) of computing devices a corporation and its partners have connected via extranets results in (N squared) the risk of having data corrupted.

With 21 months remaining to January 2000, I'm concerned there isn't enough time to remedy com-

pletely the year 2000 problem. I'm not alone.

William McDonough, president of the Federal Reserve Bank of New York, puts it this way: "The failure to get the year 2000 issue right will affect the integrity of the payments system and the performance of the global economy."

In February the Federal Deposit Insurance Corp., the watchdog agency that regulates 6,200 banks across America, issued the results of a year 2000 audit. Its findings are startling: The efforts of 124 banks are "unsatisfactory" and 1,128 banks "need improvement." The FDIC—itself eight months behind on its year 2000 solutions—plans to begin closure proceedings on the most lethargic banks by September of this year.

How many banks will close before the Wall Street bears knock several thousand points off the Dow Jones and NASDAQ averages and convince aging baby boomers to put their retirement nest under a pillow? How confident is the technology industry that the year 2000 challenge will be met by Dec. 31, 1999? Not very, if assembly bill 1710, currently proposed in the California state legislature, is any indication. Bill 1710 would limit year 2000 lawsuits for hardware and software companies to "bodily injury and the costs of correcting the problem itself."

If you lose \$1 billion worth of commerce because of a year 2000 glitch, don't go pointing fingers at the vendors. It's *your* problem.

What can you do? Follow the example of the FDIC. Commence an audit of the information partners linked to you via your extranet immediately. Categorize those partners' efforts to address the year 2000 issue into three categories: satisfactory, needs improvement and unsatisfactory.

Cut off all links to unsatisfactory partners no later than September 1998. Assess your needs improvement category every 90 days. Drop laggards in this category by March 31, 1999. Consider not adding new suppliers to your extranet from June 1999 through June 2000.

What do you think of my law of vulnerability? Send me an e-mail.

Gary J. Beach
gary_beach@cio.com



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NEWS, INSIGHT, HUMOR, REVIEWS

Edited by Katherine Auer



The Lowdown on the High-Ups

SALARY SERVICE Few things get the latent snoop in all of us salivating more than a chance to see the size of other people's paychecks. A new Web directory called Edgar Online People (people.edgar-online.com/people/) offers such mouthwatering tidbits in the form of free and detailed information about anyone mentioned in a public company's proxy filings with the Securities and Exchange Commission (SEC). The directory, a service of Edgar Online, gleans corporate information from electronic SEC filings and dispenses it to anyone with a modem, a browser and a pinch of curiosity.

This sort of data has been available in some form since the SEC's inception in 1933, but until recently gathering it has been an arduous process involving searching proxy statements one by one and constructing profiles manually. Now getting the scoop is as simple as typing in the last name of an executive of any public company and waiting while Edgar Online delivers a truckload of information including biographical details, salary, bonuses and stock options.

"If you're looking for information [on an executive], you can put his or her name in and begin to create a picture of who this person is," says Jay Sears, vice president of marketing and business development for South Norwalk, Conn.-based Cybernet Data Systems, which owns Edgar Online. The service is designed for corporate executives on the prowl for business intelligence, according to Sears. But no one will be the wiser if you want to find out how your neighbor can afford that new BMW. ■

Back to School

CIO EDUCATION After Congress enacted the Clinger-Cohen Act in 1996, mandating that most federal agencies establish a CIO post, Uncle Sam was looking for more than a few good IS executives. Now that most of those posts have been filled, federal CIOs have an opportunity to become even better managers by enrolling in a program designed to help shape the CIO role within federal agencies.

The CIO Certificate Program, run by the Information Resources Management College at The National Defense University at Fort McNair, Washington, D.C., is tailored specifically for federal CIOs and other federal IS executives. The program was designed to build competencies outlined in Clinger-Cohen, says Lt. Col. John Michel, professor of systems management for the college. Specifically, the program aims to educate IS executives

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Trendlines

on how better to meet the goal of the act, which is to improve how the government manages its IT investments. Thus, most courses in the program's 10 areas focus on business issues rather than technology; examples include capital planning, technology assessment, security, process improvement and performance-based management.

Students can apply credits earned in the program toward master's degree programs at Syracuse University and the University of Maryland. Department of Defense IS executives can take the courses for free; other federal CIOs pay \$500 per course. As of press time, 25 people had graduated and 180 were enrolled in the program, which began in February 1997.

For more information, visit www.ndu.edu/irmc/irmchp.html. ■

Findings Business Intelligence

Getting Smart

Thanks to IT, American companies are immersing themselves in more information than ever before on markets, technology and their competitors. The bad news is that they're drowning in the data.

That's according to "Ostriches & Eagles," a survey on the relationship between competitive information and business intelligence (BI) systems. In its third annual survey last year, The Futures Group, a Glastonbury, Conn., consulting firm, polled senior executives in strategic planning, marketing and business intelligence from 101 American corporations representing the aerospace, consumer products, financial services, pharmaceuticals and information products and services industries. The survey found that 60 percent have an organized BI system—up only two percentage points from the first survey. The Futures Group defines a BI system as a discrete program or function that provides a process to collect, organize and analyze information and turn it into intelligence that leads to actions.

Respondents with such systems rated the effectiveness of their companies' intelligence-gathering processes at an average of 6.4 on a scale of 10. Those without rated themselves a collective 5.5 (16 percent lower). The average across both groups was 6.1. Overall, consumer-products companies were most confident in their intelligence work, rating it at 6.4, followed by financial services (6.2), pharmaceuticals (6.0), information products and services (5.8) and aerospace (5.6).

Almost one-fifth (17 percent) of respondents did not believe competitors had used intelligence techniques against them. That belief is one of the criteria that qualify a company for "ostrich" status in the eyes of The Futures Group. In contrast, respondents felt that the leading "eagles," those that make best use of information, are Microsoft Corp., Motorola Corp., IBM Corp., the Procter & Gamble Co., General Electric, the Hewlett-Packard Co., the Coca-Cola Co. and Intel Corp. Eighty-two percent of companies with revenues over \$10 billion have an organized BI system.

Asked to identify the two most valuable sources of competitive information, 37 percent of the respondents cited "suppliers/customers" and 35 percent named "publications." Respondents without an organized BI system rely most heavily on the latter; publications are also the top choice for companies

with revenues below \$1 billion.

Do companies need to improve their intelligence efforts? Respondents' answers depended on the area in question and whether or not their companies already had BI systems in place (see "Smart Enough?" at left). The good news: Compared with the 1995 survey, respondents today are generally happier with their companies' business intelligence.

—David Pearson

Smart Enough?

Percentage of 101 senior executives in strategic planning, marketing or business intelligence who feel their company needs better intelligence in a given area

Area	1997		1995	
	With BI System	Without	With BI System	Without
Competitive Activities	53	63	70	83
Changing Market or Industry Structure	35	60	63	71
Customer or Supplier Activities	38	50	50	62
Emerging Technology Initiatives	33	45	60	67
Global Economic Conditions	18	25	30	36
Regulatory Climate	17	28	38	33
Political Climate	13	23	28	32

SOURCE: "OSTRICHES & EAGLES III," THE FUTURES GROUP.

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038

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To Catch a Cheat

PLAGIARISM DETECTOR The slacker's motto "collaboration leads to graduation" doesn't hold sway for a University of California at Berkeley computer science professor. To put a stop to cheating in computer programming course work, Alex Aiken, associate professor at Berkeley, offers a Web-based service that detects instances of plagiarism within students' programs.

The approximately 300 professors who use Moss—which stands for a Measure of Software Similarity—first register with Aiken by e-mail to use the system. The service then automatically e-mails them the client software. After receiving a user ID and password, users can enter a list of Internet files of student course work and send that list over the Net to the Moss host, a Unix workstation at Berkeley. The host analyzes the files and produces HTML pages listing pairs of programs with similar code. It also highlights individual passages in programs that appear the same, making it easy to compare the files quickly. Moss analyzes C, C++, Java, Pascal, Ada, ML, Lisp and Scheme programs.

Aiken claims Moss employs a more effective cheating detection algorithm than do systems based on counting the frequency of certain words in a program text. While he doesn't want to reveal exactly how Moss works for fear of tipping his hand to dishonest students, Aiken claims the system examines program structure to catch cheaters.

Moss has attracted the interest of intellectual property lawyers as a tool to prove software copyright infringement, Aiken says. It might even be useful for software engineers as a tool to analyze sections of code to factor out redundancies, he adds.

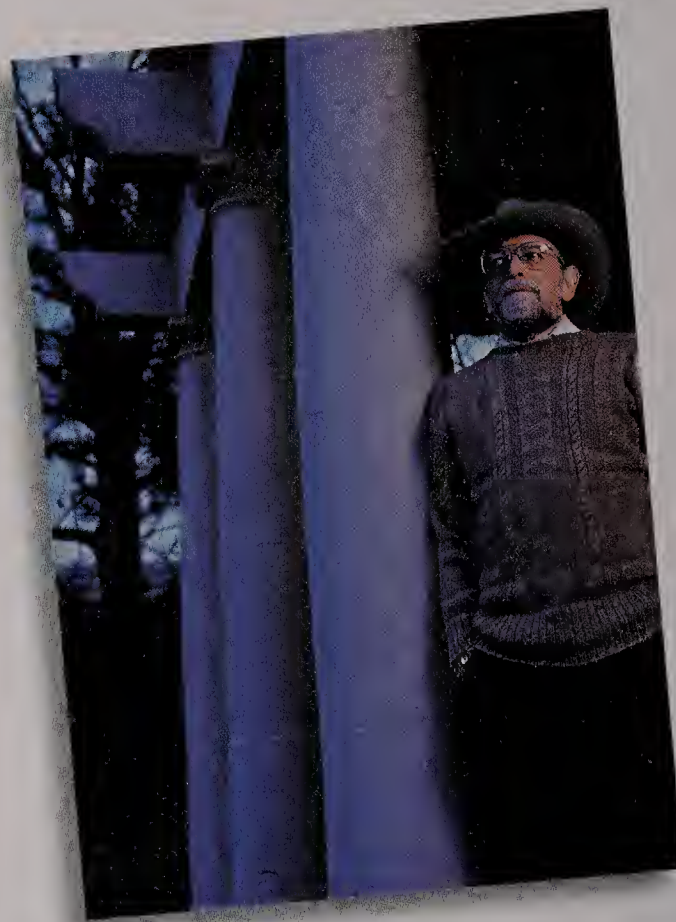
For more information on Moss, visit www.cs.berkeley.edu/~aiken/moss.html. ■



Follow the Ants

INTERVIEW Forget the spider metaphors. You can search the Internet as efficiently and effectively as an ant forages for food. At least, that's the theory behind the Ant World Server, an Internet search tool under development by Paul B. Kantor, a professor of information science at Rutgers University's School of Communication, Information and Library Studies in New Brunswick, N.J., and director of the Alexandria Project Lab there.

Whenever an ant ventures out of the anthill in search of food, it leaves behind a pheromone trail that leads other ants directly to the choice morsels. Similarly, Kantor theorizes, if Internet users could leave behind digital information



Rutgers Professor Paul Kantor believes Internet users can take a lesson from the ants.

pheromones (DIPs)—pockets of information detailing their search missions and which Web sites they've found most and least effective—then subsequent users could follow these trails to the best online information resources. The Ant World Server, which would sort and store these DIPs at private or commercial Web sites, is funded by a \$1 million grant from the federal gov-

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SOURCE: "WORKGROUP AND INTRANET COMPUTING: COST OF OWNERSHIP STUDY," GARTNER GROUP INC. THE FULL STUDY IS AVAILABLE AT WWW.GARTNER.COM.



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Trendlines

ernment's Defense Advanced Research Projects Agency.

CIO recently spoke with Kantor about his ongoing Ant World Server research.

Q. Explain the theory behind your ant metaphor.

A. If you ever have your house invaded by ants, you'll notice that while at first they

seem to swarm all over, after awhile they begin to follow pretty well-defined tracks from home to the food [because] they lay down chemical trails called pheromones. Our metaphor asks, "Why can't human beings be at least as smart as ants about searching for information?" What makes it a little tricky

is that presumably what one ant can eat, another ant can eat, so all they have to do is leave a sign saying, "Hey, good stuff." But we have fairly refined things in mind when we search [the Web], so we need to distinguish among them, and that's what we call a digital information pheromone.

Q. What are the potential applications?

A. Start with the idea that finding information quickly and condensing it into usable form is increasingly important for enterprises of all kinds. And increasingly, information is going to be available in networked environments. We see this as a tool that is going to greatly enhance the effectiveness of people trying to find information in such environments.

Q. What challenges have you faced?

A. [The Ant World Server] suffers from a problem economists call "network externalities." Why should the first person in a country buy a telephone? Similarly, why should you take your precious time to attach scores to these links or to record your purpose? We're working on making the business of sharing information as painless and easy as possible. That brings us to an area that we, as academics, don't know much about. We (the development team consists of me, a mathematician and an engineer) don't know much about selling soap, but the problems we encounter [promoting the Ant World Server] are similar. We're asking people to invest effort in something, yet they won't know whether it works until they open the box.

Q. Have you found any surprises so far?

A. At this point, the greatest surprise is the widespread public interest. I think people are aware that the Web and other networks are like the genie coming out of the bottle. We've got to learn how to make it work for us.

—Tom Field

FLASHBACK

10
Years Ago
In CIO

April 1988

There was once a time when the value of information technology could be neatly summed up in a spreadsheet. No, really. It was 10 years ago, and in a CIO article in April 1988, Martin I.

Sack, Digital Equipment Corp.'s senior group manager for IS, described how he was doing just that. Quarterly, Sack would collect figures from the dispersed Digital IS units—a dozen numbers revealing personnel salaries, asset depreciation, systems development and maintenance costs. Those figures—shipped by disk or sent by e-mail—were all coded to protect the sending office's anonymity (accountability not yet being in vogue back then). Sack rolled up the numbers and compared them to Digital's corporatewide business goals for revenue, expenses and profits projected out five years. The result was IS's contribution to the bottom line—amount saved versus amount spent.

Sadly, something so sweet and simple could never work today. No longer is IT's value thought to be based on cost savings alone. "That was the model for the '80s; IS value in the '90s is characterized by the time competitiveness and flexibility of business processes," says Digital's current CIO, Dick Fishburn (Sack left in 1992). Does IT enable the business to seize a new market opportunity quickly—and be first? Does IT provide the flexibility to revamp or destroy and re-create business processes to respond to threats? Does IT enable the culture of a company—can employees in an "information-sharing culture" easily share information? The answers to these questions determine IT's value.

Measuring such fuzzy-wuzzies is possible, if not easy, provided you know where and when to look, Fishburn contends. Time competitiveness is best measured by looking backward at what has happened, not by projecting what might happen in the future. If you are first to jump on a new opportunity and shareholders are raking in the benefits, look back to see what IT investments made that success possible. That investment versus today's shareholder value is the measure of IT's contribution.

Measurement by hindsight can take a few years. Will CEOs and shareholders wait that long for a payoff and a value metric? Will they let a CIO keep his or her job long enough to say, "I told you so?" These are questions we'll address in next month's "Flashback." You can rest assured that we won't find the answers in any spreadsheet.

—Richard Pastore



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Year 2000 Challenge *Edited by Howard Baldwin*

SMOOTHING THE CONVERSION TO THE 21ST CENTURY

The Ripple Effect

No one's immune to compliance problems

BY SCOTT KIRSNER

CONGRATULATIONS. YOU'VE readied all your internal systems for the coming millennium. You've tested everything and, compared with the rest of your industry, you feel confident that you're well ahead of the curve.

Time for the celebratory champagne? Hardly. Even organizations that execute letter-perfect year 2000

(Y2K) projects will be susceptible to what's being called the ripple effect. Suppliers, business partners, customers and other third parties who don't take care of their Y2K problems can wreak havoc on your company. Picture it: Customers aren't able to pay invoices on time, sabotaging your accounts receivable. Suppliers don't deliver raw materials as scheduled, bringing production to a halt. Failures

within just a few organizations can ripple through entire industries—and potentially the whole economy.

"We're all going to sink or swim together," says Skip Patterson, executive director of the Year 2000 Program Office at Boston-based Bell Atlantic, the nation's largest regional Bell operating company. "The people who don't fix their problems will hurt the people who do."

So to avoid being hurt by the ripple effect, Y2K project managers are turning their gazes outside the organization's walls to examine supply chains, customer bases and other external entities. "Are they going to be ready? What are their plans? Where are they in the process? Are they going to be able to do business in 2000?" asks Dick Kearney, the partner in charge of KPMG Peat Marwick Consulting's global Y2K practice in Boston. "You need to dedicate a significant amount of resources to asking those questions of your business partners."

That investigation of external compliance needs to proceed in parallel with internal remediation efforts and must be managed every bit as carefully. And senior management must understand, as Chrysler Corp. Y2K Manager Roger Buck puts it, that "your year 2000 problem isn't just in your IS shop. It's in every company that you deal with." That means outside support is crucial to insulating your organization from the damages of the ripple effect.

Y2K experts recommend six steps.

Take inventory. Just as the Y2K project begins with an inventory of how much date-related code exists, your investigation into external compliance starts with a review of the outside entities your company deals with, and their relative importance to your operation. "You don't want to forget about the noncritical suppliers," adds Kearney. "But you need to focus."

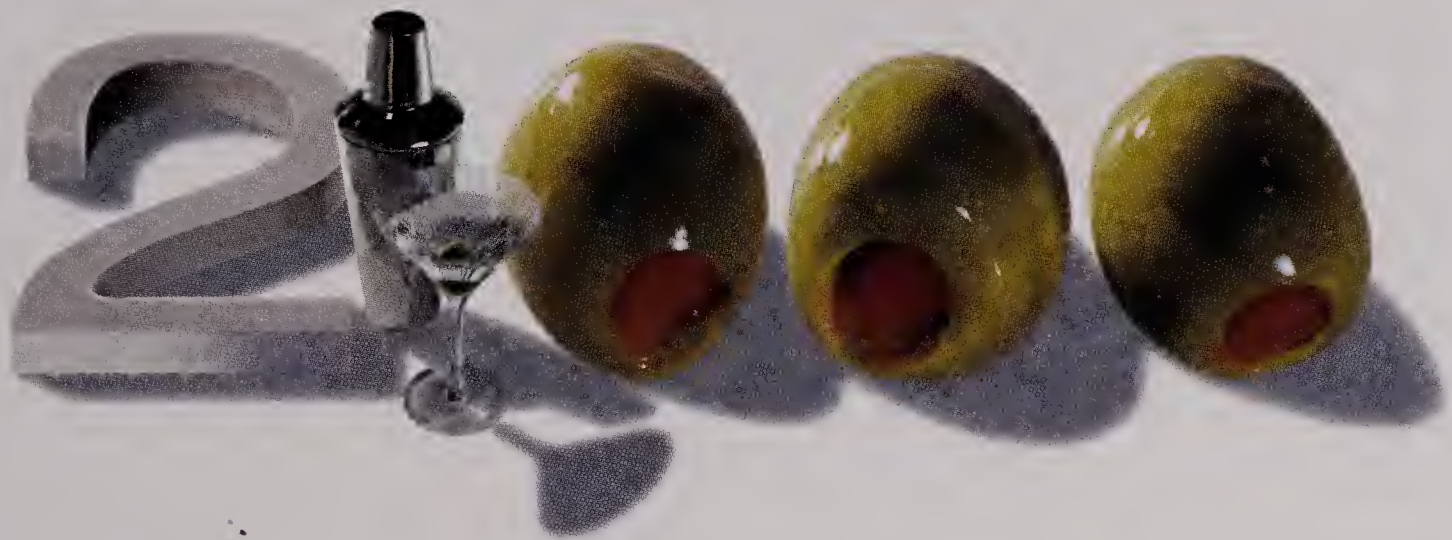
"You don't have enough time and resources to work with all of them,"



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Year 2000 Challenge

concurs Ed Yourdon, chairman of the Cutter Consortium, a technology advisory firm in Arlington, Mass. "You need to do the same kind of triage and prioritization that you do internally. And here, too, the familiar principle applies—80 percent of your revenues come from 20 percent of your customers, and 80 percent of your critical supplies come from 20 percent of your suppliers and vendors."

Investigate. Communication with outside entities usually opens with a request for information—a letter or survey asking about the status of Y2K compliance. But responses to that type of inquiry vary. You may hear nothing or get a letter from a low-level functionary that carries no weight. Matt Hotle, director of Gartner Group Inc.'s Y2K research group, says that response rates to such requests can be as low as 10 percent. And of those who do respond, "less than 50 percent are accurate," he says. "They're not trying to lie; they just don't have enough information yet." Hotle recommends a strategy after a list of top-tier business partners has been drafted: "You get a travel budget, get on a plane and go visit them. You want to look people in the eye and ask how they're doing on Y2K. If they start staring at their hands and stuttering, you know you have a problem."

Bell Atlantic's Patterson agrees with Hotle's hands-on advice. "If someone provides you with a 'priority one' service, then you're really going to want to get into their knickers and make sure that everything's OK," he says.

Collaborate. In working with outside companies, proceedings can sometimes get adversarial. No one likes to be held hostage by a single-source supplier that doesn't have its act together. But analysts and IT executives alike say that a collaborative approach is the only route to success.

"If you approach anybody with a shotgun, they're not going to be your best friend," observes David Reingold, a senior vice president at Computer Horizons, an IT services company in Mountain Lakes, N.J. "You have to approach them on a friendly basis and let them know what your deadlines are, and that you're going to test."

At NASDAQ, collaboration with the

organizations that receive information from the exchange involved a nuanced discussion of their data-related needs. "We went out to our customers and surveyed them," says Michael Buckingham, NASDAQ Stock Market Inc.'s Y2K

project manager and director of operations and planning in Trumbull, Conn. "We asked if they saw any reason for us to expand the date field. And the bulk of them said that because we are mostly a 'day system'—that is, the data is pretty

Envisioning the Ripple Effect

Can a company that used to make computer games help with the year 2000 problem?

IN 1993, THINKING TOOLS SPUN OFF FROM MAXIS, THE GAMING COMPANY that produced the software hits SimCity and SimLife. After doing custom consultation on simulation projects, Thinking Tools decided that the year 2000 problem offers a phenomenal product opportunity: producing a program that helps IT executives visualize and manage Y2K risks, both internal and external.

Working with Y2K experts William Ulrich and Ian Hayes (authors of *The Year 2000 Software Crisis: Challenge of the Century*), Thinking Tools developed Think 2000, a program that, among other things,

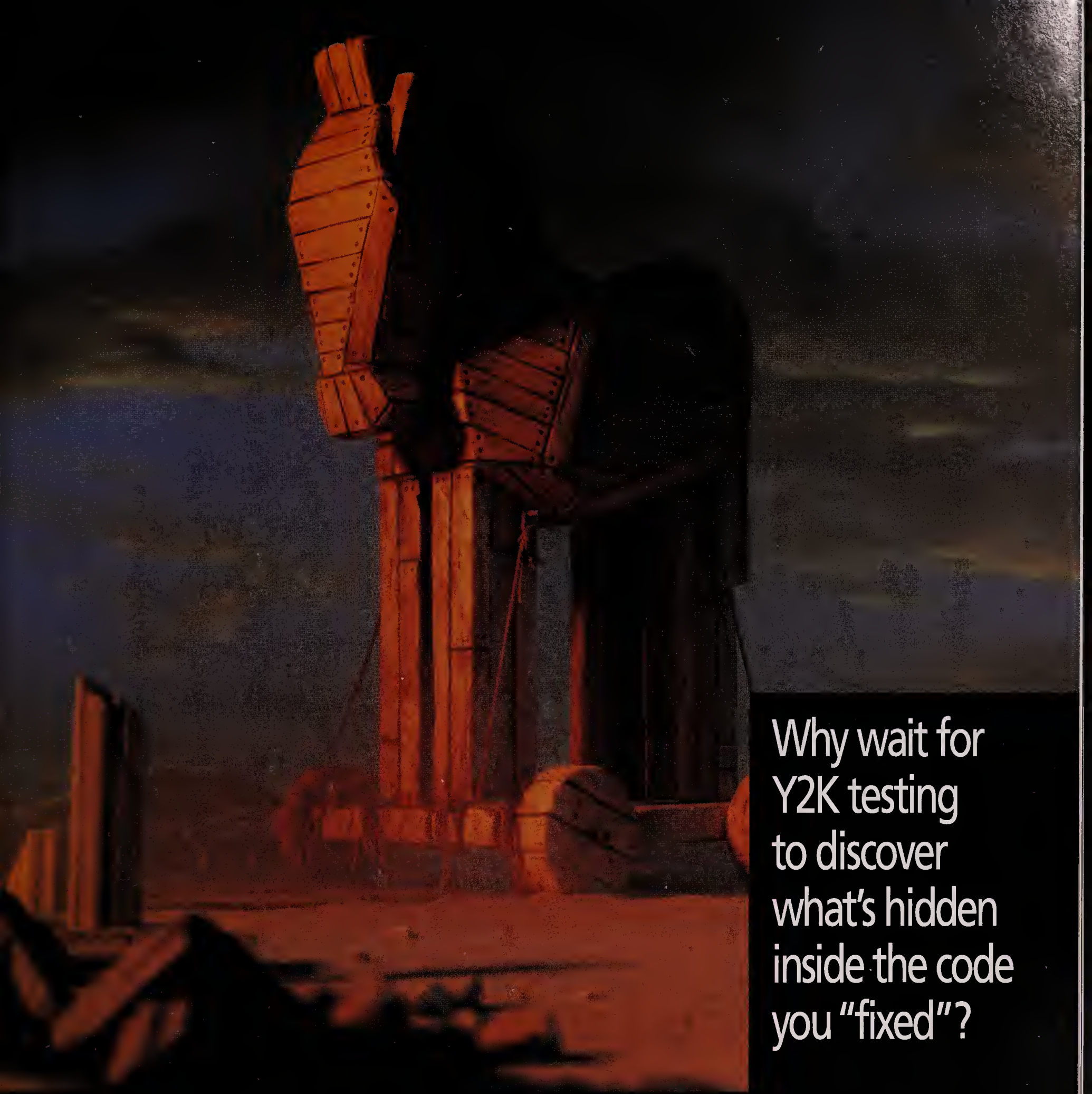
can help organizations learn more about how they'll be affected by external suppliers. "You can model...a complete supply chain and estimate the probability of a supplier failing," says Phillip Whalen, president and CEO of Thinking Tools in San Jose, Calif. "It's designed to help people deal with complex, adaptive systems that have lots of invisible interdependencies, which describes Y2K to a T."

One of the goals of Think 2000, which starts at \$25,000, is to help companies docu-

ment Y2K remediation efforts, showing, for example, how they identified a set of suppliers as mission critical. That can help ward off lawsuits, or win them if they eventually go to trial. "It's important to have good documentation of what you were thinking, and why you did what you did," says Whalen. "American society is litigious by nature, and so it's crucial to be able to protect yourself."

—S. Kirsner





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what's hidden
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Year 2000 Challenge

much today's data—we could get away with windowing.”

For companies with incredibly complex supply chains, like the Big Three automakers, collaboration has involved industrywide efforts. In February 1997, the Automotive Industry Action Group (AIAG) decided to create a year 2000 task force to help Ford Motor Co., Chrysler Corp. and General Motors get suppliers up to speed. The AIAG invited the CEOs of the top 5,000 suppliers to Detroit's automakers for a half-day seminar, after which it sent out surveys and set up an information center and a Web database.

“Chrysler has 8,000 total suppliers,” says Buck, the company's Y2K manager and chairman of the AIAG's task force. “Of those, 2,000 are critical. And anywhere in that supply chain where the link breaks, it's going to cause us problems. The other automakers are in the same situation. It's very difficult to build vehicles with missing parts and then put them in later.”

Track progress. Even when being closely monitored, some business partners may not be solving their Y2K issues as quickly as necessary. Identifying the laggards requires a measurement scheme.

“We've developed a matrix that says if [a supplier] is not at a given step in the process by a given time, they're at high risk,” says Buck. “We're kicking around the idea of giving green, yellow and red ratings, like a stoplight. Red, obviously, would mean you're in trouble.”

Craft contingency plans. Unfortunately, more external organizations may be red-lighted than a CIO would like. “We're finding that pretty much everybody we deal with as a supplier is behind the curve that we'd prefer them to be on,” says Patterson at Bell Atlantic. That scenario requires contingency plans. If one supplier can't support the business in a post-2000 world, who can? You should begin lining up alternatives as soon as suspicion about a critical vendor creeps up, suggests Kearney.

“Our company has a fair amount of experience in alternative planning,” says Patterson. “If you have a major snowstorm, what are your contingencies? How can you route around it? The dif-

ference here is that while snowstorms tend to be local, [Y2K] is pervasive.”

Most IT executives say it's inevitable that a few long-standing relationships will crumble under the weight of Y2K pressures. “1999 will be a year of saying, ‘Who isn't going to make it and what actions will we take?’” says Buck at Chrysler. “You need to do what you need to do.”

On the flip side, Hotle at Gartner

“If you approach anybody with a shotgun, they're not going to be your best friend.”

—David Reingold

Group sees a somewhat more optimistic possibility. “This problem could result in better communication within the supply chain and more partnerships,” he says, “but only if we pay careful attention to the ripple effect.”

Test and verify. Even the business partners that appear to have their Y2K issues under control must be scrutinized as the millennium approaches. The operating philosophy of many CIOs derives from an old Ronald Reagan quip about the Soviet Union's compliance with arms control rules: Trust but verify.

“The only way you can know whether a supplier has succeeded is to test with them,” says Bell Atlantic's Patterson. “Words don't count. Deliverables count. We want a field trial. We want to see it done.” And Patterson adds that small proof-of-concept tests aren't enough to assuage his worries; he looks for tests scaled to full production intensity. “We run about 400 million billing transactions a day across our network. So we don't want to know that it works, but that it works at the right scale.”

To make sure that data interchange between different financial institutions will work flawlessly after Dec. 31, 1999, the Securities Industry Association has organized a series of tests specifically for Wall Street firms. While that's possible in industries that handle information, it's tough to do in sectors like auto manufacturing. “We can't move our assembly lines forward in time,” says Buck at Chrysler. “We just have to test all the component pieces offline and verify that they work.”

Others say that upstream suppliers and interfaces can present barriers to timely testing. For example, John Thomas Flynn, CIO for the state of California, supplies information “up” to a number of federal agencies and says he can't test with them until they're ready.

For private companies that find themselves in that position, Kearney at KPMG has some advice: Be a noodle. “You say, ‘We want to run a test at the end of 1998—will you be ready?’ That shakes out a lot. If they can commit to testing, then you have a pretty good feeling that they're on target. And you also put them on notice that if they can't test with you, then you may go with some-

one else,” Kearney says. He concludes that a reasonable goal might be to run tests with your top 10 suppliers.

Don't Be Caught by the Incoming Tide

What's the priority of external compliance efforts within the Y2K project as a whole? “The ripple concern should be as big as any other concern,” says Reingold at Computer Horizons.

Fred Kowitz, the corporate director for Y2K at Ameritech Corp., a Chicago-based telephone company, even objects to the use of the word “external”—to him, making sure third parties are making progress is key to the project. “I don't think of this as being outside the walls of the company,” he says. “It's one of the cornerstones of our program.”

Two words recur in discussions about the ripple effect: communication and collaboration. Organizations must work closely with their business partners and keep a constant dialogue going to avoid being hurt by someone else's Y2K mistakes. Reingold characterizes the work required as an educational crusade. “If you've educated yourself about the danger, the next step is to educate your suppliers, and then get them to educate their suppliers,” he says. “Everyone is someplace on someone else's food chain.” **CIO**

Scott Kirsner, a Boston-based writer and consultant, is working on a series of articles for CIO on the Y2K problem. He can be reached at kirsner@worldnet.att.net.

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A River Runs

STARTING TUESDAY EVENING, JULY 22, 1997, a tropical storm resulting from Hurricane Danny dropped at least 15 inches of rain on Abermarle, N.C., a small town about 40 miles east of Charlotte. After coming ashore on Alabama's Gulf coast, the deluge swelled inland waterways and flooded a creek abutting the facilities of Allison Manufacturing, a \$70 million, 1,000-employee apparel maker.

For the last five years, the company's IBM AS/400 has been its central nervous system. It ties into Allison's financial functions, communicates with the EDI-based customer order system and inventory, and feeds manufacturing information to the company's divisions. The information determines which plants fulfill which orders, how much yarn to purchase, when orders are cut and sewn, when

BY LUCIE JUNEAU PATROWICZ

Thanks to careful planning, IS VP Glenn Wood (left) and Systems Support Manager Larry Wallingford had Allison Manufacturing back up and running in a matter of days.

Through IT

A man with a beard and mustache, wearing a dark suit and tie, is sitting and looking towards the camera. He is holding a large, rolled-up document or blueprint that is partially unrolled, showing some text and diagrams. The background is a plain, light-colored wall.

artwork is scheduled and the status of inventory. In addition to its manufacturing and administrative hub in Abermarle, Allison has five manufacturing plants and a large distribution center in Texas, another manufacturing facility in Virginia, and corporate offices and a marketing group in New York City.

Several staff members, including Systems Support Manager Larry Wallingford, were in Allison's Abermarle building investigating a power problem the night the rain began. "A drain plug had popped loose, and water was all over the floor," Wallingford says. The cable running under the floor of a recently installed AS/400 system had gotten wet, causing an electrical short.

At about 2 a.m., Wallingford checked the water level in the creek before restarting the system. "The water was getting close to the top of the dock, so we decided we'd better not start up," Wallingford says. He feared the transmitter located near the creek might blow while the AS/400 was running, creating even bigger problems for the IS team.

PHOTO BY BRIAN DRESSLER

Reader ROI

COMPANIES LOSE VITAL COMPUTING resources for many reasons. A power failure, flood or virus might bring your business to its knees unless you're prepared. Readers will learn the essentials of disaster planning, including

- ▶ Prioritizing and analyzing the company's needs
- ▶ Data backup methods
- ▶ Alternative computing arrangements

Noticing also that rainwater had begun seeping into the building, Wallingford and his co-workers decided to lift expensive IS equipment off the floor before leaving for home. But as they hoisted their whole imaging system, including a Data Archives and Retrieval System (DARS) and IBM Corp. ImagePlus onto a cutting table

in the art department, they heard a roll-up door in the docking area suddenly give way. Quickly, they ran for the main exit.

"When we got there, we saw four feet of water rushing by outside," Wallingford says. The parking lot was flooded in about 15 minutes. Wallingford speculates that a blockage upstream had suddenly broken loose, flooding the creek and neighboring areas.

The only way out of Allison's building was up: to the roof, via an inside ladder. "As we started up the ladder, the water was up to my chin," says the 6-foot-1-inch Wallingford. By that point, a lightning storm was raging, and evacuees took refuge in a rooftop shed. "We huddled in it until the storm subsided," he says. During the night, an Allison trailer bed and a couple of cars were swept downstream. By morning, rescuers arrived by boat to pluck Wallingford and the others safely off the roof.

The company's IS vice president, Glenn Wood, had left the building before the flood and expected to find nothing worse than some puddling around the building's doors when he returned the next morning. Instead, he discovered that chairs, desks, PCs and file cabinets had been swept up in the tidal wave. "Four chairs from my office were washed out of the room, down the hall, through the computer room and into a programmer's office," Wood says.

The company's newly upgraded AS/400 and its new uninterruptible power supply (UPS) system were destroyed, along

with its supporting IBM Twinax and token ring network and a new IBM electronic imaging system. Gone too were three other LANs and a large Ethernet network of Apple systems used to create artwork on Allison's garments. And despite the efforts of

Wallingford and his colleagues, the whole imaging system was lost. Of all the computer equipment in the building, only one CRT was salvageable.

IT SO HAPPENS THAT THE MOST COMMON RISKS to a business are disasters of the man-made variety, resulting from simple mistakes, negligence or sabotage, says Lisa Maio Ross, senior analyst for outsourcing at International Data Corp. (IDC), a Framingham, Mass.-based market research and consulting firm and sister company to CIO Communications Inc. Such disasters include hardware and software malfunctions, power failures, computer viruses and hackers. Those occurrences—along with such natural and political disasters as tornadoes, earthquakes, fires, floods, severe storms or bombings—can bring a business to a standstill.

System disruptions, however, are not the most common problem, reveals a recent survey commissioned by Comdisco Inc., a Rosemont, Ill.-based vendor of disaster recovery solutions. When they do happen, whether they have serious consequences on a business depends in part on how long a company can afford to operate without its systems. For example, companies relying most heavily on electronic recording of customer transactions can least afford downtime (see "The Cost of Downtime," Page 40). Companies in industries that don't depend on continuous electronic transactions won't face ruin if their systems go down briefly; they worry most about lengthy disruptions and disasters capable of destroying their IT systems completely.

To avoid catastrophic disruptions, a company needs a continuity plan that will both minimize downtime in the event of IT destruction and allow the organization to carry on without computer support for a limited period.

It's probably no accident that the companies with the best IT recovery plans and testing practices are on the West Coast, says Fred Joy, a senior research analyst at Meta Group Inc., a market research firm in Stamford, Conn. Because California is a land of many natural hazards, people there appreciate the need for disaster planning.

Abermarle, on the other hand, isn't exactly the epicenter of natural or political instability. Until the recent disaster, Wood's system had been down less than half a day since he installed his first IBM AS/400 five years ago. In fact, if Hurricane Hugo hadn't torn through the Carolinas in September 1989, Allison's business, like its flood waters, might have receded from memory after the July disaster. Destruction in the Abermarle area during Hugo was heavy, and storm damage interrupted vital services. For almost a week following the hurricane, the town had no water and power outages were frequent. "We lost two disk drives at once, and I had to recover all my data," Wood says. "Twice."

But Allison didn't suffer any serious business loss after Hugo. "We were really lucky, and we knew it," says Wood.

Disaster Plan

Twelve steps to recovery

- 1** Enlist the cooperation of upper management
- 2** Seek help from qualified experts
- 3** Conduct a business impact analysis to identify key business functions and IT resources
- 4** Assess the risk of particular disasters based on company profile and location
- 5** Devise a detailed, flexible plan that outlines staff responsibilities
- 6** Select a company- or vendor-based recovery option (that is, a redundant system, hot site, mobile data unit or quick shipment solution)
- 7** Cover all IT resources, including telecommunications networks and LANs
- 8** Select IT equipment vendors that can provide prompt service
- 9** Maintain updated vendor information
- 10** Test your plan at least once a year
- 11** Don't underestimate IT needs: Maintain a strong technical support staff and plan to replace lost equipment with more powerful equipment
- 12** Structure the workload to address top priorities first

SOURCE: RESEARCH COMPANY OF AMERICA

Unfortunately, most companies will postpone contingency planning until after disaster strikes, experts say. "It's difficult for companies to justify the expense because they can't immediately see the ROI," says IDC's Ross. But when a disaster hits home, planning for the possibility of IT destruction suddenly seems anything but wasteful. Because of Allison's experience with Hugo, the company was better prepared to deal with the July catastrophe.

AFTER MANAGERS RECOGNIZE THE NEED FOR planning, they should begin to develop a detailed IT recovery plan based on analysis that determines what computer resources are available, what's running on them and how critical they are, Joy says.

The business impact analysis should reveal a company's most critical exposures, says Chuck Hannah, a partner at Hannah-Watrous Continuity Strategies LLC, a consulting firm in Hartford, Conn. Companies need to identify which computer operations must be kept up and running in the event of a disaster and develop a plan for alternatives for computer operations and recovery procedures. "It's a matter of prioritizing," Hannah says. Which business functions are most important and need to be protected first? Which functions could the business survive without for an extended period?

Within a few months after Hugo, Wood initiated an evaluation of Allison's business needs. He assigned a staff member to coordinate the development of a recovery plan and met with him regularly for two years to work out the details. Before they could consider how they'd address a possible disaster, they had to think about what the disaster might look like. "We had a hard time wrapping our arms around that one," Wood says.

The Dow Chemical Co. in Midland, Mich., is one company with well-established recovery procedures, but getting to that point took time. "We originally started doing disaster recovery more than 20 years ago," says Dave Butler, director of global information systems at Dow. He adds that the emphasis and scope of recovery planning are changing. "The concept has evolved from disaster recovery to business continuity," says Butler.

"Within each function, for each business, we examine key processes and make a determination of how quickly we would have to be fully recovered," he says. At Dow, customer service functions typically get top priority. "Logistics, order processing and shipping need to be recovered within 24 hours," he says. "But in the event of disaster, accounting says they can be [online] last."

It's a cost-risk assessment. "If you come up with a single answer for the whole company, either you're under-prepared or you're spending money you don't need to," Butler says. "If you're planning to recover everything in 12 hours, you're simply throwing money away."

While it makes sense to spend time planning for the most likely event, a recovery plan must be flexible. "It's the unusual problem that's going to burn you," Wood says. Since they couldn't write detailed procedures for every possible emergency, Wood and his colleagues set

Going Mobile

When disaster strikes, mobile units offer a flexible solution because they can be moved as a company's needs change

FOLLOWING UNUSUALLY HEAVY WINTER SNOWS, the spring thaw of April 1997 began flooding the Red River in North Dakota, and businesses and residents in downtown Grand Forks were forced to evacuate.

Yet even while Community National Bank President Bill Lee was calling Wayne, Pa.-based SunGard Recovery Services Inc., he knew the company wouldn't be using a hot site solution. It was impossible to cross the Red River for a stretch of about 200 miles because bridges were underwater, so driving to Minnesota—where the area's hot sites are typically located—would have been out of the question.

Long before the flooding, Lee had rejected the hot site alternative because the bank relies on imaging technology to produce customer statements, and many hot sites don't provide imaging, he explains. Instead, Lee called SunGard to declare a disaster on Sunday morning, April 20, and requested a mobile unit. It was shipped from Phoenix at 8:30 that night and arrived about noon on Tuesday on a semitrailer, which was parked behind a temporary site in the town of Larimore, 30 miles west of Grand Forks. There was ample room in the unit to accommodate five data processing professionals, a Unisys A4-311 replacement, the imaging system, a high-speed laser printer and a few file servers, says John Ouradnik, vice president and cashier at the bank.

On May 19, the bank returned to its home site, installing its mobile unit behind the building there until June 26, when a new Unisys Clearpath machine arrived.

Mobile solutions provide clients with independence when they need it most, Ouradnik says. "When you have a mobile unit, you can kind of take control again. If nothing else, it's good for the psyche," he says. "It makes life easier when you're dealing with so many other things anyway," he adds.

"Service providers such as IBM and Wang Laboratories Inc. suggest that a mobile data recovery site works really well for a call center that needs to take calls routed to agents," adds Alice Murphy, former senior industry analyst at Dataquest. Mobile centers can seat up to 50 people and provide the PC and phone connectivity that call centers need when their own centers are damaged.

—L. Juneau Patrowicz



Community National Bank President Bill Lee rejected a hot site solution for a mobile alternative.

COVER STORY: DISASTER RECOVERY

up a process to help management evaluate a crisis and take appropriate steps. "First, we needed to try to decide who would be making decisions," Wood says. That choice was based on the severity and breadth of the catastrophe: IS staff could handle a problem affecting the data center alone; a team of company VPs would be responsible for coordinating a response to a major disaster.

Recovery plans like Wood's typically include details such as the names and phone numbers of staff members, information about the company's IT products, supplier contacts and phone numbers and the system's configuration.

However, it's not unusual to neglect one or more pieces of the planning puzzle. About 85 percent of Fortune 1000 companies have disaster recovery plans, says Donna Scott, research director at the Stamford, Conn.-based Gartner Group Inc., which provides IT research and advisory services. But 80 percent of those that do have plans that cover mainly their data center resources. Only about 50 percent cover networks, while less than 35 percent have plans that would pro-

route traffic through Australia, Butler says.

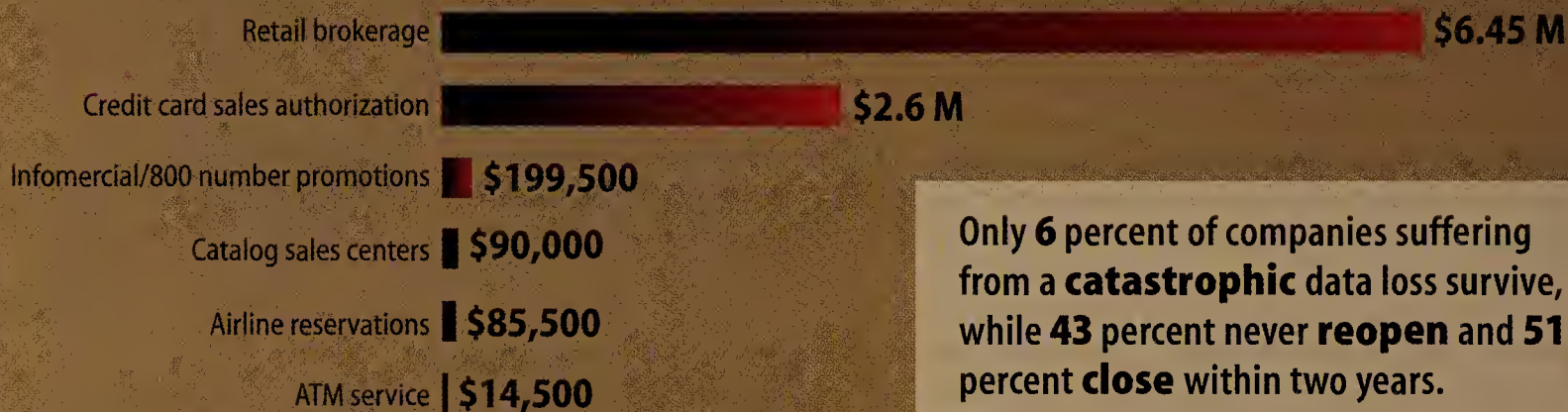
In addition, most large, best practice companies have budgets for disaster recovery. "In large companies, [the recovery budget] usually runs between 2 percent and 4 percent of total [IS] costs," Butler says. Such companies also rely on outside expertise. But experts can't do it all. "There's really no substitute for thinking through your business processes and anticipating what you would do in the event of a significant disruption," says Butler.

ANOTHER KEY TO A SUCCESSFUL RECOVERY plan is to store copies of critical computer data in another location.

For decades, security-conscious companies have backed up their data regularly, storing tapes offsite. Large companies have even turned to vendors offering recovery centers equipped with computing resources. But changes in technology are fueling a shift in emphasis. Business units throughout an organization now typically require access to electronic information and resources, often shared over net-

The Cost of Downtime

The average financial impact per hour of interrupted computer operations (by industry)



SOURCE: CONTINGENCY PLANNING RESEARCH INC., LIVINGSTON, N.J.

Only 6 percent of companies suffering from a catastrophic data loss survive, while 43 percent never reopen and 51 percent close within two years.

SOURCE: UNIVERSITY OF TEXAS

tect the data on their PC LANs, she says. Far fewer appear to have any means of recovering their Internet work, despite a growing reliance on that resource.

But companies are becoming increasingly aware of the need to safeguard telecommunications services. Vendors are building dedicated networks strictly for disaster preparedness, according to Ellen Carney, director of network integration and support services at Dataquest, a market research firm in Westborough, Mass. That means that client companies sharing these resources don't have to depend on local phone companies for bandwidth in an emergency.

To cover its communications path to Japan, Dow Chemical put in its own redundant network, establishing a path from the United States to Australia to Hong Kong to Japan. If there's a break in the path from the United States to Japan, the network will

works. And because electronic transactions and communications take place so quickly, the amount of work and business that can be lost in an hour far exceeds the amount that might have been lost a decade ago, says Tim Ging, vice president and manager for corporate business continuity at Pittsburgh-based PNC Bank, a 25,000-employee operation with branches in eight states.

Many LAN administrators don't follow the most basic data security procedures, says Bruce Watrous, Hannah's partner at Hannah-Watrous Continuity Strategies. "I've seen LAN servers where they're not sure the backup [procedure] works," he says. IS staff can monitor backup procedures and insist on maintenance contracts that assure the quick replacement of equipment in an emergency. In addition, contracts with recovery vendors can include coverage for LAN

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COVER STORY: DISASTER RECOVERY

resources. It's important to keep up-to-date information on these resources so that it will be available when needed.

It's also important during the planning process to select a strategy for protecting computer operations, Hannah says. Safeguarding data by sending backup media offsite on a daily basis is essential. But IT recovery planning also means ensuring the availability of alternative computing resources if the company's resources aren't available.

A company's recovery strategy may include reliance on its own IT resources, using a third-party recovery center—such as hot sites, mobile data units or quick shipments of computing equipment—or a combination of options. Solutions should cover telecommunications networks, LANs and peripherals.

A company may maintain redundant systems for its most critical operations or enter into a reciprocity agreement, arranging to share resources with another company or data center within its own organization in the event of a data center disaster. "Different divisions of corporations that have decentralized computing organizations may build disaster recovery planning around having enough excess capacity at different locations to accommodate them," Hannah says. But advances

are wired, air-conditioned and have raised flooring—that can be used to house people or replacement equipment. A hot site is a recovery location that offers computing resources. Ideally, a hot site should be located within 30 miles of a client site so that employees can travel there easily, says Gartner's Scott.

The three largest disaster recovery vendors—IBM Corp., Comdisco Inc. and SunGard Recovery Services Inc.—maintain hot sites near many North American urban centers as well as overseas, equipped with multivendor resources and telecommunications capabilities. These companies offer workgroup spaces too, either at their hot sites or at separate locations, equipped with office furnishings and machines, PCs and peripherals, as well as call-management systems for users manning call-in centers.

Dow's call-in center serves a critical business function. "If we were to lose that center, customers wouldn't be able to place orders," Butler says. "[We need] another location with all the equipment—with a phone system, with desks and PCs and so on—so if we lost that customer order center, we could move and be up in 24 hours," he says. Comdisco provides the hot site that serves as Dow's backup call-in facility.

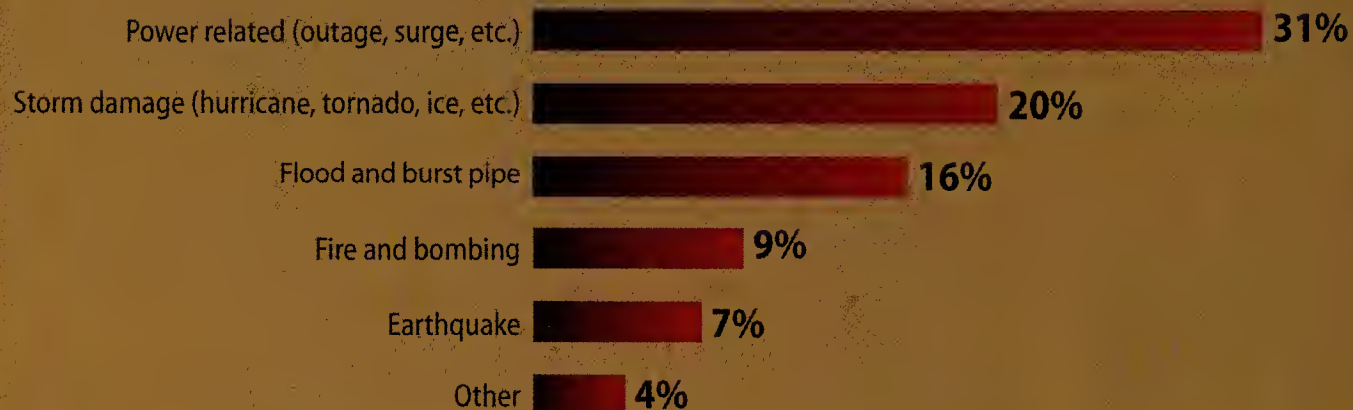
Some companies contract with vendors for hot sites that include equipment that can be configured quickly to match their systems, but they don't electronically transmit data to these sites. "You can have just the computer sitting someplace where your data

Although 98 percent of CIOs polled believe it is important to have a disaster recovery plan, 25 percent do not have one in place.

SOURCE: RHI CONSULTING

Fire and Ice

Leading causes of computer downtime for more than 12 hours



SOURCE: CONTINGENCY PLANNING RESEARCH, LIVINGSTON, N.J.

in telecommunications are leading to greater consolidation, and fewer companies are maintaining decentralized systems, he says.

A popular planning strategy is to contract with a vendor for a recovery site, which is an alternative data center or workspace. Vendors also offer mobile data units or workspaces that can be moved to a site of the company's choice. A third option involves the speedy shipment of equipment to a user location.

Recovery sites can provide various services. Cold sites consist simply of prepared environments—that

is not," Hannah says. In the event of disaster, the company would deliver a backup tape to the site.

More sophisticated hot site arrangements involve remote electronic vaulting. "You may be doing backups to the hot site," Hannah explains. "[That's] commonly done in high-risk applications." Transferring data electronically reduces recovery time.

Companies in industries relying heavily on electronic transactions may need to recover data entered up until or very close to the time of system failure. Some companies electronically transport journal or



log information to their hot sites at relatively short intervals—say, every few hours. Instead of having to re-create a full day's transactions—as they might if they were submitting backup data electronically at the end of each day—they would, in the worst case, lose only a few hours' worth of transactions. Database mirroring updates database information at the hot site instantaneously, so it is always current and the remote system can take over immediately.

Many large companies use a combination of strategies and turn to multiple vendors for recovery solutions. "For some of our high-availability systems, we will have redundant systems, so if we lost one, another would be immediately available," PNCBank's Ging says. "For some systems that do not have to be recovered immediately, we will use hot site vendors. It's more advantageous to use multiple vendors just to make sure we have the level of service we're looking for."

Finally, building recovery consciousness into day-to-day operations and testing formal plans can assure disaster readiness. Many companies test their plans periodically to make sure they're adequate, staging mock disasters to see how they fare. Best practice companies tend to hold tests twice a year, Meta Group's Joy says. "If companies test less than twice a year, they tend to get bit by the natural volatility of their environments. Changes can accrue that invalidate plans," he says.

THE FLASH FLOOD THAT HIT ALLISON IN July nearly totaled the company's IT systems. In keeping with the company's recovery plan, Wood and two other business-side executives met within hours of the disaster at a vacant Allison ware-

tract with IBM, Wood could request hot site support, a mobile solution or quick delivery of a new system. That kind of flexibility is atypical, notes Scott. "Normally, you contract for one type of solution because pricing is based on the type and kind of equipment provided," she says. The more options a contract allows, the higher the price.

Wood opted for a quick shipment to an already established temporary site, and his replacement AS/400 configured to Allison's needs was on the road later that day. Within 30 hours of Wood's call to IBM, Allison's replacement machine was in place. A day later, the company's data had been recovered, and the AS/400 was ready to roll.

Having an empty warehouse close by made it easy to find an appropriate spot for the temporary machine and workspace for those who'd been displaced. "It was all part of the plan," Wood says. "The building was considered our backup site."

One advantage to the quick shipment option is that it typically costs less than going with a hot site. Wood's temporary machine cost Allison \$300 a day. Allison had six weeks to replace it with a permanent machine or the company would have incurred more prohibitive costs. Machine costs might have been lower at IBM's hot site, but Wood determined that the cost of employee travel to Charlotte and overnight accommodations would have made that alternative more expensive.

The company's biggest concern following the disaster was minimizing customer inconvenience. The morning after the flood, Allison called its EDI providers to ensure that messages that didn't get picked up for two or three days would be saved. Allison also called its biggest customers to let them know that it needed a couple of days to acknowledge orders.

For all their planning, however, the IS team still hit a snag. Since developing the plan, a new phone system had been installed, and nobody had checked with the vendor to make sure replacement equipment could be brought in quickly. When Wood called after the disaster, he was told it might take two weeks to get parts. After some negotiating, the vendor agreed to deliver the equipment the next day, and Allison didn't have to pay a big penalty for its lack of foresight. "At most, we could have gotten [the system] up half a day faster," Woods says.

For some businesses, such as Allison, the story ends happily. Allison Manufacturing was able to reconstruct its LANs in three weeks, and cutting, knitting and printing operations were soon back in full swing. Damage to the whole company was estimated at about \$10 million. But without proper planning and a strong business recovery system, Allison's survival story could have been a cautionary tale. **CIO**

Lucie Juneau Patrowicz, a freelance writer based in Salem, Mass., can be reached via e-mail at patrowic@shore.net.

The market for business/disaster recovery services is expected to reach \$3 billion by 1999.

SOURCE: DATAQUEST

Tell Me Where It Hurts

The average financial loss per one hour of disk array downtime (by industry)

Securities	\$29,301
Manufacturing	\$26,761
Banking	\$17,093
Transportation	\$9,435

SOURCE: FIND/SVP, NEW YORK

house uphill from the flooded building. There, they assessed damages, and Wood determined the best computer recovery option.

Impressed with the service IBM had provided him during the Hugo cleanup, Wood had chosen IBM Business Recovery Services from a short-list of possible vendors. According to the terms of Allison's con-

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Can Federalism Fly?

Far-flung offices can crunch numbers as fast as headquarters, reviving the old conundrum of how tight IT should hold the reins

BY CHRISTOPHER KOCH

IT HAS BEEN A LONG TIME SINCE EACH AND EVERY one of your Federal Express packages made a pilgrimage to Memphis. These days, Graceland is a bigger draw than Federal Express's central processing hub. Armed with handheld computers and bar code scanners that connect to a deeply intelligent, computerized routing system, FedEx agents and drivers can now route packages through a series of smaller hubs around the world or bypass the hubs altogether and throw the packages on trucks for direct, point-to-point delivery.

But while the packages go on their merry way, the same cannot be said for the information FedEx uses to track them. Every bit of information about the whereabouts of a FedEx package—about 12 bar code scans per package, up to 50 million per day—comes home to Memphis to be sorted and stored. “Right now the information is like the old package model, with everything coming into Memphis and sitting there waiting for someone to do something with it,” laments Mark Ramsey, managing director of technology architecture planning at Federal Express Corp. in Memphis.

Does Ramsey's problem sound familiar? It should. It's a classic dilemma: How much IT power and information should you hold at the center and how much should you let flow to the fringes of the organization? You've probably struggled with the question before, but today there is a new urgency to the issue. Business processes, especially those that impact the company's external customers, are changing at an unprecedented pace. IT is losing its ability to keep up.

Reader ROI

ONE CLASSIC DILEMMA for CIOs is when to be strict about data and when to let go. In this story we'll reveal

- ▶ When to deploy resources centrally and locally
- ▶ What should be in an enterprise architecture document
- ▶ How to balance IT centralization and decentralization on a global scale

PHOTO BY JACK KENNER



Managing Federal
Express's technology
architecture puts
Mark Ramsey smack
in the flight path of
50 million bar code
scans every day.

"The rate of change in business processes has outpaced our ability to deliver new systems," says Larry DeBoever, senior vice president of Enterprise Architecture Strategies for Meta Group, a Stamford, Conn.-based research and consulting company. DeBoever estimates that the life cycle of a company's core business processes has dwindled from an average of seven years in the '80s to just twelve months today.

Optimizing the ways that IT organizes itself, makes decisions and parcels out resources may be the last best hope for catching back up. "Decentralization [versus] centralization has become the most crucial question for top management when it comes to IT policy and management," says Niv Ahituv, a professor of management and information systems policy at Tel Aviv University in Israel. He chuckles, "The problem is getting worse as the technology gets better."

The days of extreme centralization of IT (the mainframe era), with its bureaucracy and lack of flexibility, are over. And most CIOs are finding the chaos of decentralization (the client/server era), with its redundancy and lack of coordination across the organization, to be equally untenable. The solution: IT must consciously impose a companywide strategy that allows for responsiveness and local initiative while maintaining centralized coordination and authority.

Chaos versus Control

Each philosophy has a price. But today, with the costs of communication and computing power plummeting, companies can take both approaches at once.

As costs decrease, IT will feel more pressure to release power and information to the periphery of the organization, some researchers believe. The concept is not new. America's founding fathers used it to create the federalist structure of American government, organized to make decisions at the local level whenever possible, delegating to higher levels decisions that could not be resolved locally. By using decentralization and centralization strategically, CIOs can offer the business the best of both worlds, a high degree of independence and autonomy combined with rich access to the organizational information of a centralized computer network.

To be effective, however, federalism

Gauging the Corporate Tolerance

How do you decide which IT activities to keep close to home and which to let stray from view? Get a sense of the factors that affect your business's tolerance for centralization and decentralization, suggests Niv Ahituv, professor of management at Tel Aviv University in Israel.

CULTURE. If your CEO doesn't delegate, think twice about giving the business units carte blanche.

SIZE. Small business units usually cannot afford to pay for their own IT support.

IMPORTANCE. Centralization works best with systems that are vital to the health of the company.

CONNECTIVITY. The tighter a new system is linked to principal processes, the more likely it is to be held centrally.

USERS. The more users you have, the greater the need for central control.

COST. The cost of communications, equipment and personnel play an important, but not dominant, role in the decision.

APPLICATION. Packaged software tends to favor more widespread distribution.

UNIQUENESS. If an application is unique to a certain group, its development should be delegated directly to users; similarly, data that is sensitive, such as personnel files, should be kept at the local level.

AVAILABILITY. If timeliness is critical, then data will usually tend to be more local than central.

must be formalized and documented. In IT, this is best represented by a tract called the enterprise architecture: a set of principles that guide the use of technology in all areas of the company and set basic ground rules for buying computers and software and controlling IT support and application development, as well as other important activities (see "Gauging the Corporate Tolerance," this page). Your architecture maximizes local business units' abilities to make independent decisions about IT while maintaining enough consistency across the organization to be able to adapt the company's IT infrastructure as quickly as possible when business processes change.

The downside to this federalist outlook is that it requires a common denominator approach to creating IT standards and principles. "Somebody has to lose," says DeBoever. "You can't have the best data architecture and the best network performance." Sometimes you have to "dumb down" the components to serve the interests of the whole. He compares the process to the design and manufacture of a jet plane. "Airplane designers can't just go out and design the best wing; they have to design it in the context of what they want to do with the assembled whole," he says.

Global Economies of Scale

The most urgent goal behind most good enterprise IT architectures today is to sup-

port the quest for economies of scale in business processes. To move information, service, support and employees across national boundaries, suggests DeBoever, you need increasingly consistent processes around the world. That means creating common IT infrastructures and applications to serve those processes.

In case you haven't noticed, your customers are demanding consistent processes and sales strategies across countries and business units, too. David Moores, chief architect of IS at Nortel, the Toronto-based global telecommunications equipment manufacturer, knows this all too well. Nortel's product-focused divisional structure worked fine when customers were primarily large telecommunications companies that knew exactly what they wanted from the various divisions at Nortel. "It's been OK historically that if we couldn't ship all of an order we'd ship what we could and then ship the rest later," says Moores. "The companies we sold to could tolerate that and they could make do with a partial order because they understood what everything was and could get to work with what they had."

Today, says Moores, Nortel's customers—mostly big telecommunications companies like MCI Communications Corp.—no longer have the time or resources to build a network based on equipment delivery schedules. They're under the same global pressures as Nortel. "Our customers are becoming



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while also getting the
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integrated solution
provider?”

—David Moores,
Nortel

more global and don't want to build all the networks themselves anymore,” says Moores. “They want to buy them from us and sell the bandwidth to their customers. They are not interested in how we run our business; we have to look seamless to them so that the network gets there in time—no matter where it is sourced from within Nortel.”

But seamless cannot become homogeneous, says Moores, because Nortel's success has come from its roots as a group of independent—even competitive—business units. “The question is, ‘How can you get the benefits of being a small company while also getting the economies of being a big, global integrated solution provider?’” asks Moores. “There are con-

flicts between those two goals. We want to square the circle and say we can be both.”

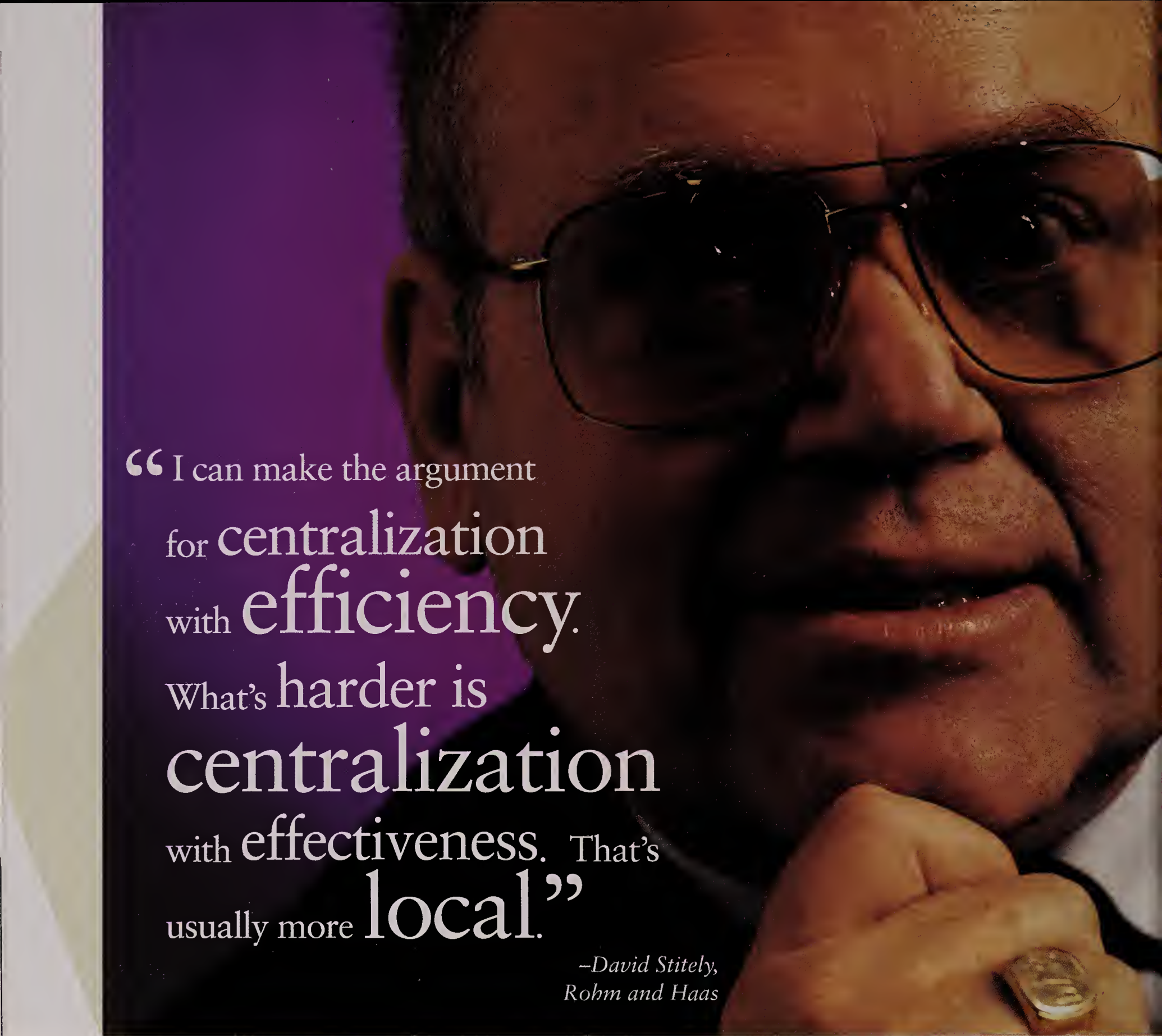
Nortel's solution, which Moores says will be in place sometime this year, will be to maintain the sanctity of the individual business units' sales and R&D processes while pulling the order fulfillment processes to the center of the organization. “We're saying that these managers' responsibilities are not to run factories anymore, they are to bring business to Nortel,” says Moores. “The products they invest in and customers they go after are their own to shape and that's where we preserve the fast-moving response and the entrepreneurial aspect of the company. Then when it comes to the fulfillment of the order, they will follow a centralized

process that is the same for all the business units. Our message to the units is, ‘Don't mess with the franchised processes.’”

Corporate IT, long subordinate to the business units, will gain a new voice in the organization, with a much stronger push toward shared use of strategic systems and central ownership of the network. “Our goal is to become like the city planning office, establishing zoning regulations and issuing building permits,” says Moores.

Diplomacy across Borders

Global companies that don't aspire to be “solution providers” like Nortel can take a much more centralized view of global processes and IT, believes David



“I can make the argument
for centralization
with efficiency.
What’s harder is
centralization
with effectiveness. That’s
usually more local.”

—David Stitely,
Rohm and Haas

A. Stitely, CIO of Rohm and Haas Co., a \$4 billion chemical manufacturer based in Philadelphia. His company has been on the efficiency hunt for quite some time and has had global aspirations even longer. But until recently, the two forces ran counter to each other. Stitely recalls being assigned to Rohm and Haas’s French subsidiary in the mid-1970s, when he worked for corporate finance. “Our European operations back then were a bunch of subsidiaries and startups that acted as fiefdoms,” he recalls. “They ran the country, and product didn’t move across borders—even if it was the same product.”

Those country managers are now long gone. The plant managers serve the lines

of business, regardless of geography. Stitely sees the same evolution occurring in Rohm and Haas’s Asia-Pacific operations, where the country fiefdoms will soon give way to process. As communications improve and logistics and supply chain processes become more sophisticated across the region, single points of source will emerge, larger plants will spring up and shipping across borders will become easier, says Stitely.

Stitely has already created that kind of unified, geographic free flow in Rohm and Haas’s IT architecture. There is one worldwide corporate network, one e-mail system, one PC desktop configuration and one data center in Philadelphia. There is another data center in Japan, but it’s

scheduled to be closed down. “People who want to drive new applications have to make sure they work on the standard infrastructure configuration of the company,” Stitely says. The centralized philosophy reflects the pressures on Rohm and Haas from its customers and competitors. “I can make the argument for centralization with efficiency all the time,” says Stitely. “What’s harder is to make the argument for centralization with effectiveness. That’s usually more local.”

To promote local effectiveness, Stitely keeps his hands off the various business units’ decision support software. “They have created all kinds of applications that they support themselves,” he says. “They have to use the corporate infrastructure

IT must consciously impose a companywide strategy that allows for responsiveness and local initiative while maintaining centralized coordination and authority.

and pull all their data off the network, but we have local network people supporting them." The only chink in the Philadelphia data center's armor is computer-aided design and manufacture schematics, which hog network bandwidth and are allowed to remain on local servers in five locations around the world.

A Question of Trust

There is a price for maintaining such tight control, however. Centralized IT tends to engender stealth, resistance, even grass-roots rebellion. When Pallab Chatterjee took over as CIO of Dallas-based Texas Instruments (TI), which has a tradition of tight control over all of the company's IT decisions, he found that the business units weren't asking IT for anything—they were too scared.

"We used to try to put every IT project in the company under the IT umbrella, but we never did because there were so many underground projects in the business units," says Chatterjee, who's also senior vice president of TI's Semiconductor Group. "We still believe that having IT come together in one place is the way to go, but going out and measuring every little IT cost to the company isn't worth it. If a local manager is convinced that a million-dollar system is worthwhile, he's already being measured on the profitability of the unit, so we don't need to categorize the project under IT. In fact, we get more involvement in those kinds of projects now because the business units have less fear of being turned in to the CFO," he chuckles.

Chatterjee has divided TI's worldwide IT services organization into two business models. One he refers to as the "worldwide utility." This translates into the boxes and wires that hook the company together globally. The focus here is on effi-

ciency, sameness and tight central controls. Chatterjee controls the company's data center and WAN strategy and dispatches staff to local sites around the world to maintain the local LANs. The utility group focuses on reliability and driving down total cost of ownership.

The other business model Chatterjee uses is based on consulting. Those staff members not involved in TI's worldwide utility (all 2,000 TI servers around the world are monitored electronically) are put to work as consultants to each of the business units and factories at TI. The consulting approach puts Chatterjee's staff together with local IT staff to work on quick-and-dirty projects, while keeping some consultants located centrally to work on big process changes that affect TI as a whole. "The local projects don't need to come through central IT for approval," says Chatterjee. "The ones that come through are the ones that are being considered for worldwide deployment. We don't want to see the others because we're just cycle time and bureaucracy to them."

Chatterjee admits that the new system of checks and balances has been a tough sell. The business units want to pay less for the utility's services but still have the utility do more. To keep things from getting testy, Chatterjee designates "people relationship managers" to work with each business entity as well as TI's corporate group to determine their collective needs.

The Components

These relationship managers help Chatterjee's cause from a human perspective, but they also do something else. They help IT get early warnings from the business, signs of change and a chance to act more quickly. As process life cycles continue to shorten, time is IT's most critical ally and its most subversive enemy, argues Meta Group's DeBoever. For example, standardizing worldwide

on a single software program may seem quicker to implement and more cost-effective on paper than allowing multiple programs, but if the single package is so complex that local IT people can't service it, or corporate IT needs six months to perform an upgrade, any initial cost savings will be swallowed by time. On the other hand, rigid procurement policies rob IT and the business of precious time when the requisition for new customer service software must go before six different sets of eyes.

It is less important to control people's specific software and hardware choices than to control the impact of those choices on the network and the company's business processes, adds DeBoever. "A successful enterprise architecture is not a list of acceptable hardware and software choices," he says. "That's critical, but it's not enough."

Regardless of where the activities take place, either centrally or locally, IT must create a companywide manifesto for designing, selecting, implementing, supporting and managing IT infrastructure. The CEO—not the CIO—should be the one waving it in front of the business unit mobs, inciting them to follow. And the business units should have some incentive, besides the rabble-rouser's eloquence, for supporting the manifesto's principles.

For IT, a manifesto that outlines the most effective blend of local responsiveness and central coordination offers a shot at being able to predict and react to changes in the business more quickly and with better coordination around the world. If CIOs ignore all else, they should make sure that the ability to respond dominates their enterprise thinking from now on, counsels DeBoever. "Engineer into the IT architecture the ability to change and engineer out the things that inhibit change," he says. **CIO**

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Several states accepted the challenge to bring the conveniences and efficiencies of today's technologies to their huddled masses. As a result, these "electronic governments" are creating new liberties...

...and Just IS for All

BY PETER FABRIS

Reader ROI

IN ORDER TO MEET THE CUSTOMER SERVICE demands of the public, state governments are ramping up electronic commerce services in a big way. Find out

- ▶ How electronic commerce is reshaping customer service in enterprises with poor service reputations
- ▶ Why the goal of reaching mass populations with e-commerce requires judicious use of several technologies, not just the Web
- ▶ Why marketing and interagency cooperation are more important than technical prowess
- ▶ Strategies for authenticating users of e-commerce services

In Massachusetts,

the Registry of Motor Vehicles has been a perennial target for the barbs of columnists and comedians alike. A mere mention of the department conjures up visions of long lines during the lunch-hour rush and dreadful customer service delivered by surly clerks. And fair or not, the public holds many government agencies in similar low esteem.

But more and more, government officials acknowledge that the public is increasingly unwilling to tolerate inefficiencies in government offices that still keep bankers' hours. And why should they tolerate them? After all, even bankers' hours have changed to offer 24/7 service with ATMs, online banking and call cen-

ELECTRONIC COMMERCE

ters. At long last, governments are getting serious about improving service, and they're counting on electronic commerce to make it happen.

It's not just agency heads pushing government into electronic commerce. Top office holders such as Iowa Gov. Terry Branstad have placed electronic government prominently on their agendas. Branstad is propelling Iowa into the era of electronic government with a project called IowAccess. The goal is clear: "Anybody should be able to access services at any time

of Minnesota's office of technology. Gunyou's strategy: to create a Web site in conjunction with his state's electronic commerce program, called North Star, to provide Minnesota motorists with forms for every transaction—licenses, registrations, payment of speeding tickets, parking tickets—to keep their cars on the road.

The site is still in development, but Gunyou says that much of the technical work to design and support such a site could be completed in short order. Bureaucratic problems arise

because automobile transactions touch several government bodies and getting different agencies to agree on anything takes a lot longer than it does to do the HTML coding for a Web page. "One of the big frustrations in any kind of government reorganization is dealing with turf issues," Gunyou says. He points out that the state has successfully consolidated its education department and other agencies responsible for child care and welfare into one agency. That move promises better service to children, he says, but it took four years to accomplish.



Citizens can take heart that governments are at least striving for simplicity and ease of use in their electronic commerce projects.

from anywhere," the governor says. Adds Jim Youngblood, director of Iowa's information technology services office, "We want to come as close as we can to serving 100 percent of the population."

That aim is ambitious for any organization, particularly one limited by government constraints. But with the state of technology today, it doesn't seem quixotic. The Web, interactive voice response (IVR) systems, interactive kiosks and electronic benefits transfer systems can all move Iowa—and other states—forward. The keys to reaching the objective of high-end service for all include technological expertise, to be sure, but even more important success factors may be marketing savvy, the ability to make systems simple to use and the willingness to cut through bureaucratic boundaries.

Beyond the Web

The much maligned motor vehicle departments of several states, it turns out, are pioneering what some are calling "electronic government." In Minnesota, for instance, the department of public safety is responsible for both drivers' licenses and car registrations. Citizens don't care which government agency takes care of which transactions, says John Gunyou, former executive director

Citizens can take heart, though, that governments are at least striving for simplicity and ease of use in their electronic government projects. Iowa officials, for instance, are working with the Internal Revenue Service and Social Security Administration to develop the State Tax and Wage Reporting System (STAWRS), which will give employers one Web site to report all state and federal employee tax and wage informa-

Who's Calling, Please?

States struggle to find simple solutions to the authentication dilemma

AUTHENTICATION—MAKING sure a customer is truly who he or she claims to be—is a thorny issue when it comes to automated systems. Any enterprise that builds automated systems to collect sensitive data such as credit card numbers, addresses and income statements must also take great pains to prevent unauthorized users from accessing that information.

In Massachusetts and Arizona, motorists using motor vehicle department systems on the Web make payments with their credit cards using secure sockets layer (SSL) encryption technology that comes standard with Netscape Navigator and Microsoft Explorer

Web browsers. The security standard is commonplace in the private sector; the same standard can work well for government agencies, too, says Larry McConnell, director of information services for the registry based in Boston.

Other security and privacy issues abound, however, McConnell says. For instance, Massachusetts drivers can't use the Web to execute the simple transaction of letting the registry know that they've moved. The reason? Pranksters could change other people's addresses. "All I need is for someone to change somebody's address to the governor's house," he says.

One solution to authentication problems lies in digital signatures, or digital IDs, which

tion. The state can then distribute a consolidated report to the appropriate agency.

Such one-stop-shopping sites will go a long way toward reaching the goal of making agencies easier, more convenient and cheaper to do business with via the Web than by snail mail or visiting offices in person. In order to develop those one-stop sites, cross-jurisdictional cooperation is essential, but as Youngblood says, that doesn't come naturally for government entities.

A Web site that has several related government services smartly organized and easy to use will certainly be a hit with much of the public. Typing and clicking for a few minutes on a PC beats standing in line for an hour to renew a driver's license. But what about people who don't own or have access to PCs? Governments want to reach as many of those citizens with electronic government services as possible. Because almost everyone has a telephone, IVR can be a key component of electronic government.

The humble touch-tone telephone "isn't snazzy, but it sure is useful because everybody knows how to use one," says Brant Huddleston, IBM's global solution manager for motor vehicle systems in Bethesda, Md. In Arizona, IBM developed an IVR system for the Department of Motor Vehicles that offers the same services as its Web site. In the first month of operation, IVR was by far the more popular interface among Arizona motorists, outperforming the Web site by a ratio of 8 to 1. While one reason may be the department's efforts to advertise the IVR, another likely reason is that people are generally more willing to turn to the telephone than to the Internet to perform transactions. The message: Though the Web is the darling of technology pundits, the telephone comes much closer to hitting the bull's eye when the goal is reaching 100

percent of the population. Someday, the Web will certainly reach more of the population. But until that day comes, enterprises should not ignore alternatives such as IVR.

Some agencies use IVR for surprisingly sophisticated transactions. The Massachusetts Department of Revenue, for instance, rolled out income tax return filing by phone in 1994. Last year 400,000 of the state's 3 million taxpayers filed their income taxes by punching numbers on their telephone keypads. The system has proved popular because taxpayers get much quicker refunds—almost all within four days or less—when they file by phone instead of by mail, which can take four to six weeks.

In addition, Massachusetts has stopped printing its short form, so taxpayers who want to file state returns using the simpler form must now file by phone. The state, in essence, has forced hundreds of thousands of residents to use IVR when filing their returns. Frederick Laskey, senior deputy commissioner for the Massachusetts Department of Revenue, says that strategy was risky. The department placed a huge bet on public acceptance of IVR for a mission-critical transaction. Officials had to take great pains to ensure that the Telefile system was user-friendly and nearly mistake-proof or the public outcry would have been louder than a sonic boom. During development, the department held focus groups with its own employees and average taxpayers for input to make the system easier to use. They even enlisted the help of neighboring states' departments of revenue by asking their employees to test the system before it went online.

Meeting Special Needs

Agencies looking to reach 100 percent of their constituencies by using electronic government have had to make provisions

for citizens with special needs. The Florida Department of Labor and Employment Security wants its successful unemployment claims IVR system—which serves over 80 percent of its customers—to serve everyone, including non-English-speaking users. In a state with a large Hispanic population, creating Spanish language scripts was essential, and scripts for Haitian-speaking customers may follow. The department is even considering tailoring the system for the hearing impaired.

Both the Bay State and the Sunshine State overcame a prevailing negative public perception of IVR technology. "People's experience with IVR has been overwhelmingly negative," Huddleston says. Many have had frustrating experiences with automated phone systems—getting stuck in "voice-mail jail" by not being given the option of talking to a live operator within a voice-mail system. Agencies will have to expend as much effort as Massachusetts and

are part of the "public key/private key" encryption process. In that process, an end user releases his or her public key to the world but keeps the private key secret. When sending a message via e-mail, the user "signs" the message with the private key. The recipient of the message can use the public key and a digital certificate held by another party to verify the signature and be sure the message is from the person claiming to have sent it.

Making digital signatures binding in the courts usually requires states to pass new legislation. Twenty-four states have either passed such legislation or will vote on it during the current session, according to Janet Caldwell, director of the Institute for Electronic Government, an IBM-sponsored research laboratory in Washington, D.C. Debate over digital signature laws revolves around who should hold the digital certificates: the state or a trusted third party, Caldwell says. The prevailing trend currently favors the third-party, private-sector solution, says Larry Rodda, principal in the EC practice's public sector group

at KPMG Peat Marwick in Sacramento, Calif. Governments are looking to the financial industry, which has a vested interest in resolving the issue quickly, to establish standards for digital signatures, Rodda says.

Some agencies have devised simpler solutions to the authentication problem for certain transactions. For example, Florida's Department of Labor and Employment Security issues an unemployment compensation claimant a personal identification number. When claimants report their employment status through an IVR system, they enter that number for verification. In Massachusetts, taxpayers who file their state income taxes using the IVR Telefile system simply speak their names and Social Security numbers over the phone. The system keeps an audio recording of each voice signature. The procedure has never been challenged, says Frederick Laskey, senior deputy commissioner for the Massachusetts Department of Revenue. "No one has ever said, 'Hey, that's not my voice,'" he says.

—P. Fabris

ELECTRONIC COMMERCE

Florida did on user interfaces if they want the masses to accept electronic government technologies.

Another method of electronic government delivery, interactive kiosks, could effectively reach those lacking Web access. But so far, kiosks have not caught on in test applications. In Illinois, for instance, IBM pulled the plug in November 1997 on a network of 10 motor vehicle department kiosks—designed and funded by Big Blue—after an 11-month trial because not enough citizens used the devices to justify the cost of maintaining them, according to Huddleston. What was the problem? A lack of publicity hurt, Huddleston says. “We did not anticipate the need for an aggressive marketing campaign,” he says. Having learned that lesson, IBM hired the prominent advertising agency J. Walter Thompson to promote Service Arizona’s Web and IVR motor vehicle project.

Location was another factor in the Illinois kiosk failure, Huddleston says. Most kiosks were placed in malls because malls attract a lot of people. But the public didn’t take to them at those locations. Other locations tended to generate higher kiosk usage. Huddleston won’t specify those sites for fear of giving away some hard-earned marketing research, but he will say that “24-hour enterprises” produced the best results. Despite the Illinois failure, Huddleston believes that kiosks may still prove useful for certain functions. For instance, they can be equipped to dispense official documents such as fish and game licenses. Neither the Web nor IVR can do that.

Assuming agencies can create electronic government systems that the public finds easy to use, another factor will affect their acceptance: funding. Some states have imposed user fees on electronic government systems to pay for their development. Arizona charges motorists an extra fee of \$6.95 to renew car registrations by IVR and the Web. That fee goes directly to IBM, which developed and paid for the systems at no charge to the state in an arrangement similar to the one the company had with Illinois.

Arizona assesses an \$8 fine for motorists who renew registrations late, so it does pay for procrastinators to renew by IVR or the Web. For most residents, though, renewing by mail is preferable because they don’t have to pay an extra fee. Arizona’s partnership with IBM enabled the state to fund the system without spending one cent of taxpayers’ money. “We didn’t put the taxpayer at risk if the systems failed or weren’t used,” says Russell Pearce, director of Arizona’s Motor Vehicle Department. It makes sense to have those who use the systems

pay for them, he adds.

But the fee-for-use strategy is a disincentive for nonprocrastinators to use the systems. The cost for the agency to process a renewal through the Web and IVR is just one-fifth the cost of processing by mail, Pearce says. So the user fees pay for the system, but they also discourage the majority of the public from renewing their registrations in the least expensive way.

In Massachusetts, the motor vehicle registry doesn’t charge an extra fee for registration renewals over the Web, and the public has responded favorably. About 50,000 motorists have

Assuming **agencies** can create electronic **government** systems that the public finds easy to use, another factor will affect their acceptance: **funding.**



renewed registrations, ordered special license plates and paid speeding fines over the Web during the first 16 months of operation. The registry funded the Web system out of its general budget and didn’t need user fees to pay for it. The system cost about \$50,000, a modest amount given the payback, says Larry McConnell, the registry’s director of information services. But the cost of building an IVR interface was prohibitive—the servers and software alone cost about \$300,000. Because of RMV budget limitations, the registry opted not to suggest an IVR interface to the governor’s office.

Just as in the private sector, government agencies need to consider electronic commerce projects from the customer’s perspective. That means policymakers have to think like marketers and consider factors such as pricing, convenience, simplicity of interfaces and promotion if they are to attain their goal of reaching entire constituencies with electronic government systems.

If they address those issues wisely, they just may change the public’s attitude toward government agencies. Leaders such as Iowa’s Branstad are betting they can. “People sometimes think government is too big, too far away and uncaring,” Branstad says. “We can change that perception by making services more

easily available to people on their terms.” And who knows? Maybe electronic government will even enable motor vehicle departments to redeem their reputations. **CIO**

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Finding It Online

Arizona Department of Transportation
www.dot.state.az.us/

The Institute for Electronic Government
www.government.ibm.com/gov/global.nsf/?opendatabase

IowAccess www.state.ia.us/government/iitt/iowaccess/index.htm

Massachusetts Department of Revenue
www.state.ma.us/dor/dorpg_tc.htm

Massachusetts Registry of Motor Vehicles www.state.ma.us/rmv/

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Edited by Howard Baldwin

Scanning from the Network

Playing from their strengths, two titans aim to simplify scanning

BY JOHN EDWARDS

PERHAPS YOU'VE HEARD THE ONE ABOUT THE network coffee maker. "Why build a coffee maker with an Ethernet port?" asked the leery CIO. "Because we think it will perk up your performance and our sales," replied the salesman.

OK, it's a rotten joke. But now that network scanners are arriving on the market, one has to wonder if hardware vendors haven't run out of peripherals to add to corporate networks. With scanners on the network, can coffee makers be far behind?

The unusual facet of this advance in technology is that two major vendors are tackling the same problem from unique positions of strength. Hewlett-Packard Co. is building a network scanner that works like its formidable network printers—you use an Ethernet port to plug it into the network, giving users access to a high-speed shared peripheral. Xerox Corp., on the other hand, is adding scanning software to its digital photocopiers, giving users access to scanning via a familiar, user-friendly device. To HP and Xerox, each method has its viability—but some of their competitors are still skeptical.

Paper Training

While the concept of a network scanner may sound like just another example of vendor excess, the idea actually makes solid business sense, says Ed Smith, senior imaging network administrator at BAX Global, the Irvine, Calif.-based air freight and global logistics shipping company formerly known as Burlington Air.

"By installing a network scanner, an organization can make a costly piece of equipment available to many users. It's an excellent way to amortize the cost of an expensive peripheral while adding a powerful new capability to a business process," says Smith.

Last year, Palo Alto, Calif.-based Hewlett-Packard introduced the



Network ScanJet 5, a device that allows users to scan paper-based documents, convert them into electronic form and simultaneously send them directly to one or more recipients. The unit works like the opposite of a network printer, providing document input functions rather than output capabilities.

HP Product Manager Steve Maronick, based in Bergamo, Italy, explains that the Network ScanJet 5 is tailored for use by workgroups. "If you go to a conference, for example, you can quickly distribute the printed information you collected by scanning it and directing it to your workplace team. The recipients can then edit the information, annotate it, print it or store it electronically," Maronick notes that the same sort of digital efficiency can be applied to a wide range of other paper-based documents that routinely enter offices.

A Network ScanJet 5 compatible with Ethernet networks is priced at \$2,999. A version that supports Fast Ethernet and token ring technology sells for \$3,199. Both models feature a control panel that allows users to create distribution lists for transmitting documents to specific network destinations. PaperPort, from Visioneer of Los Gatos, Calif., is included as the product's client software. Also provided is a limited edition of Omnipage,

IN THIS SECTION

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an optical character recognition (OCR) program published by Caere of Los Gatos, Calif.

BAX Global has installed a Network ScanJet 5 on each of 60 networks at company locations across the United States. "We're using them to scan in shipping documents produced in-house and by our customers," says Smith. "We then use the scanned documents for a number of tasks, including package tracking, auditing and accounts receivable."

BAX Global plans to begin adding the technology to its networks worldwide this year, thanks to significant savings in both time and money. Before the technology's rollout, employees faxed documents by long distance into the company's centralized file database or to another fax machine for manual scanning into the database. "A 50-page batch of documents would take anywhere from 30 minutes to an hour to transmit by fax. The process now takes about 10 minutes," reports Smith. Additionally, the company is now able to save money by using its frame relay network to transmit document files, eliminating long-distance charges.

Down the road, Smith is looking for HP to expand the scanner's ability to send documents directly to multiple printers. It currently supports 30 units, while Smith would like it to work with 200 or more. "Once we have that capability, we can virtually eliminate all intra-company faxing worldwide," says Smith.

It's the Law

Matthew Caston, former IT director at Leydig, Voit and Mayer, a Chicago law firm that serves technology clients, also finds the network scanner to be a useful peripheral. A single network ScanJet 5 serves 170 lawyers, legal assistants and other workers on the firm's headquarters network.

Caston says the Network ScanJet 5 helped reduce the firm's paper consumption by converting printed documents into more easily manageable electronic documents. "It's a technical law firm, so it's constantly receiving schematics and technical diagrams by mail and fax. The scanner allows them to distribute these documents to specific users without

Seeking a Definition of What It Means to Be Compliant

Is this necessary or just a remarkable grasp of the obvious?

ONE OF HISTORY'S BEST examples of good intentions coupled with bad timing was the recommendation from the director of the U.S. Patent Office, who suggested to President William McKinley at the turn of the last century that his office be closed down because "everything that can

YEAR 2000

be invented already has been." As we approach the rollover to the next century, we have a lesser, but no less appropriate, example.

The IEEE Computer Society has put forth the draft of a standard for year 2000 terminology (neumann.computer.org/standard/pasc/y2draft.htm). It's 14 pages long, but

the part about what constitutes compliance can be condensed into a single paragraph. Far be it from us to criticize the oldest and largest association of computer professionals (100,000 strong), not to mention the largest technical society within the Institute of Electrical and Electronics Engineers.

But some people are concerned that the world economy is going to shift in reverse so quickly its teeth are going to be sheared off its gears. With the turn of the century less than two years away, doesn't this standard come a little late?

Kevin Lewis is the volunteer technical editor for the IEEE Computer Society's Year 2000 Terminology

Study group and a standards consultant for Digital Equipment Corp. He doesn't argue with the criticism that this standard comes late for some people or that it may be overly broad. "We wanted to be sure it was sufficiently broad to include people who have been developing solutions, but also that it properly fit the expectations of organizations that have not paid close attention to this," he says, noting that the Society also wants to set up a legal benchmark for the inevitable lawsuits. "People are going to want to know, 'What does my customer expect of me when they ask if I'm Y2K-compliant?' As broad as it is, I think this standard is going to answer that question."

Leon Kappelman, chairman of the Y2K working group for the Society for Information

Management, is nonetheless aghast. "I think their intentions are good, but what's the point? It's too little, too late. It panders to the vendor, [who's going to say] 'our stuff will be fine as long as everybody else's is.'"

What's worse, complains Kappelman, is that it constitutes energy spent in the wrong direction. "This just adds to the

noise. The credibility of what we've done in the last 50 years is on the line here. What we've built has a serious flaw and we're not fessing up to it."

Time will tell. One only hopes that if we still have a patent office a century later, we won't have Y2K backlog 100 years from now.

—Howard Baldwin





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going from desk to desk to drop off photocopies," he says. He notes that users also like the convenience of being able to view documents directly on the workstation and not having to rummage through paper files in order to find a particular document.

The network scanner attracts a steady stream of users, and the firm is thinking about adding another unit or two to keep pace with the demand. Installing the network scanner was both practical and financially sound. "It would be far more expensive for them to give each user his or her own scanner, not to mention the fact that a scanner consumes a lot of desktop space," Caston observes. "All around, a centrally located network scanner makes more sense."

Caston's only complaint about the Network ScanJet 5 concerns the Visioneer PaperPort software that sits on the desktop PCs. He says the program is a bit too bulky to fit comfortably on the firm's older PCs, which are equipped with small capacity hard drives. Otherwise, he is satisfied. "The unit works well. It saves the firm a lot of time, particularly when we need to get edits done on an old 60-page printed document that was never saved in a digital format."

Xerox's Original Strategy

Meanwhile, Rochester, N.Y.-based Xerox announced plans late last year to offer scanning capabilities on its Document Centre 220ST and 230ST digital network systems. The software, called CentreWare Network Scanning Services, allows users to automatically route scanned documents to any network destination—even to a user's own PC.

Xerox claims that its technology makes document scanning as easy as photocopying. After inserting one or more documents into a feeder, the user selects a destination on the unit's touch-screen interface and pushes the familiar start button. Mark Hill, vice president and general manager of Xerox's digital systems business unit, boasts that his company's solution does for scanning what the speed-dial button did for the telephone.

The CentreWare option adds \$1,995 to the price of a Document Centre 220ST or Document Centre 230ST, which have base prices of \$11,595 and \$14,995, respectively. The Document Centre 220ST offers a scan rate of 20 pages per minute while the Document Centre 230ST scans at 30 pages per minute. Both units can automatically scan double-sided documents. Like the HP solution, Visioneer PaperPort client software enables users to drag and drop scanned images into an array of applications.

"We expect office workers to discover many new ways to cut steps from their work processes and easily move information from the paper to the digital domain and back," says Hill.

Johnny Young, director of the General Services

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T&E over the Web

If YOU HAVE A GLOBAL SALES FORCE, you know that keeping track of its travel and entertainment (T&E) expenses can frequently be a nightmare of rekeying and reimbursement. To



speed the process, Redmond, Wash.-based Portable Software Corp. has Web-enabled the latest version of its **Xpense Management Solution** (XMS) so that workers can update their expense reports using a Netscape or Microsoft Web browser from wherever they happen to be. XMS also runs on Windows desktops.

The server portion of XMS runs on Windows NT and requires an e-mail connection from most major mail applications and a SQL database from Microsoft, Sybase or Oracle. XMS expense reports link automatically to financial systems and can be set up for exception-based auditing, which flags only those expense reports that are outside of travel policy. The software is designed to analyze T&E trends, manage cash flow, negotiate better vendor rates and monitor policy compliance. For more information, call 800 478-7411 or visit www.xpense.com.

Deploy and Manage

HERE'S A TYPICAL SCENARIO: Your staff writes a custom business application and tests it in simulated conditions as close to real life as possible. The application is deployed and, for reasons unknown, it starts misbehaving. You want to know yesterday, right? You want to look at a systems management console and see where the application is going awry. But building management information into every application is a genuine hassle. That's where True Software's **TrueRelease** comes in.

According to True, its new package (following its problem-tracking and change-management packages) provides the connection between application development tools and systems management tools. TrueRelease can take a custom-built client/server or even a packaged application and automatically create what the company calls an "application component warehouse." Once it has this information, the software can perform two important processes. First, by analyzing these components, the package creates a map of the dependencies that exist in applications. Second, it generates the tools whereby these components can be managed by applications like IBM's Tivoli TME or Computer Associates' Unicenter TNG.

TrueRelease is written in Java and is Corba 2.0 compliant and will run on any platform that supports a Java virtual machine. It doesn't come cheap, however—pricing starts at a cool \$300,000. For more information, call 781 890-4450 or visit www.truesoft.com.

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Administration's reproduction and visual arts division, was one of Xerox's first CentreWare beta testers. About a year ago, while looking for a way to transfer printed documents onto the GSA's Web site, Young signed up for the beta test. Young added CentreWare to a Document Centre 220 copier last fall, giving 120 network users scanning capabilities.

Young says employees in the GSA's services department are using CentreWare to scan an array of agency directives, forms and other documents into Lotus Notes for sharing via the groupware application. "I've found that the more people I hook up to the technology, the more good feedback I get," says Young, who is now looking to acquire a CentreWare-equipped Document Centre 230ST that he will add to another GSA network serving about 65 users.

Standing on the Sidelines

Despite the optimistic appraisal of early adopters and the trailblazing of two industry titans, not all scanner vendors are rushing to introduce similar network peripherals. With personal scanner prices on a steep price decline, many vendors are pouring their marketing efforts into high-volume standalone models. Other vendors, who may offer network scanners in the future, are currently standing on the sidelines, willing to let HP and Xerox discover whatever level of demand may exist.

James Lundy, product marketing manager for Xerox Corp.'s office document product group, points out that most scanner vendors are still focusing on providing Twain-compliant models, which require a direct PC connection, simply because they're simpler. "The architecture of network scanners is more sophisticated. Overall, the design issue has held vendors back," he notes.

Holly Hillberg, business imaging systems program manager for Rochester, N.Y.-based Eastman Kodak Co., which makes standalone scanners, believes that network scanners will never completely replace standalone models. She asserts that network scanners can't give users the same amount of control over a document as a personal unit. "A network scanner isn't as flexible as a personal scanner," she observes. "You can't fiddle with the document in an application before transmitting it to other users."

But Lundy insists that network scanners have a solid future. "As intranets and extranets become more popular, more applications will become automated. This will drive network scanning and eventually add even more enhancements." **CIO**

John Edwards is a technology writer based in Mount Laurel, N.J. He can be reached at EdWords@prodigy.net.

LEADING

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Rubber Bandwidth

TOO BAD THERE'S NO MEDICATION available for global network congestion. Even with a wide area network, your mail packets can get clogged with your file transfers and suddenly turn your network into an expressway at rush hour. NetReality Inc. is targeting this traffic trouble with its new **WiseWan** hardware and software system, which is designed to help corporations manage bandwidth and reroute

network traffic when network segments bog down. For instance, if you're conducting a videoconference between Boston and San Francisco, you really don't want those packets to compete with traditional e-mail. Using a technology called adaptive circuit-based shaping, WiseWan lets you send the e-mail at once, clearing the information superhighway for the more urgent video data.

The product has four components.

The WiseWan 200 dedicated hardware system links to the network and supports multiple

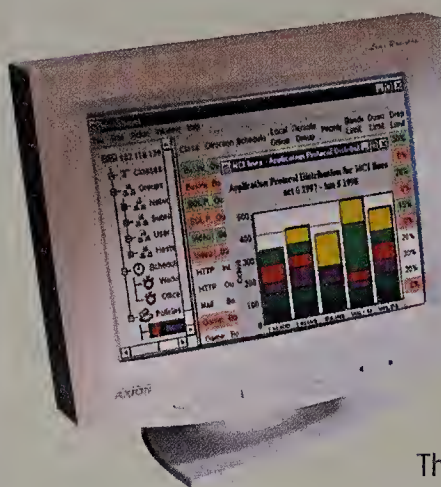
WAN connections, line speeds and protocols. The WanShaper software monitors the circuits and reallocates bandwidth according to corporate policies and network status. The WanSentry software analyzes network traffic and provides real-time feedback about the applications and users affecting network the most. The WanXplorer software is a Java-based application that handles diagnostics, troubleshooting, resource planning and management of bandwidth utilization policies.

The complete system costs \$14,995. For network managers who need to manage multiple WiseWan installations on multiple links, the WanXplorer component is available for an additional \$9,995. For more information, call 888 596-6777 or visit www.net-reality.com.

Java Productivity Applications

THAT DIDN'T TAKE LONG. For CIOs who don't want to commit the time to creating their own Java productivity applications, **Adaptivity** has created a set of five applications for deployment on any Java-capable desktop. As such, they can be used for intranet or extranet applications. The company claims that a systems manager can appropriately customize these applications within a couple of hours, but we'll withhold judgment on such an optimistic statement.

Five packages are scheduled for April availability: HelpDesk, for managing customer support requests; Contact, for event planning and contact management; DefectTracking, for managing the process of defect reporting; CollaborativeWorkspace, for managing document creation and retrieval; DataPublisher, for managing data queries, statistical analysis and ad-hoc reporting. Two more packages, focusing on human resources and financials, are scheduled to be shipped later this quarter. Prices for each package start at around \$15,000. For more information, call 650 655-2222 or visit www.adaptivity.com.



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INDEX

Page numbers refer to the first page of the article(s) in which the company is mentioned.

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Company Index

Adaptivity	58
Allison Manufacturing	36
Ameritech Corp.	28
Arizona Department of Transportation	52
BAX Global	58
Bell Atlantic Corp.	28
Caere	58
Chrysler Corp.	28
CIO Communications Inc.	36
Coca-Cola Co.	18
Comdisco Inc.	36
Community National Bank	36
Computer Horizons	28
Contingency Planning Research Inc.	36
Cutter Consortium	28
Cybernet Data Systems	18
Dataquest	36
Digital Equipment Corp.	18
Dow Chemical Co., The	36
Eastman Kodak Co.	58
Edgar Online	18
Federal Express Corp.	46
Find/SVP	36
Ford Motor Co.	28
Futures Group, The	18
Gartner Group Inc.	18, 28, 36
General Electric Co.	18
General Motors Co.	28
Hannah-Watrous Continuity Strategies LLC	36
Hewlett-Packard Co.	18, 58
IBM Corp.	18, 36
Institute for Electronic Government, The	52
Intel Corp.	18
International Data Corp. (IDC)	36
International Public Access Technologies	52
KPMG Peat Marwick	52
KPMG Peat Marwick Consulting	28
Leydig, Voit and Mayer	58
Maine Employers Mutual Insurance Co.	68
Massachusetts Department of Revenue	52
Massachusetts Registry of Motor Vehicles	52
Maxis	28
MCI Communications Corp.	46
Meta Group Inc.	36, 46
Microsoft Corp.	18
Motorola Corp.	18
NetReality Inc.	58
Nortel	46

PNC Bank	36
Portable Software Corp.	58
Procter & Gamble Co., The	18
Rohm and Haas Co.	46
Sprint Business and Decision Analyst Inc.	18
SunGard Recovery Services Inc.	36
Texas Instruments	46
Thinking Tools	28
True Software	58
Verisign Inc.	52
Visioneer	58
Wang Laboratories Inc.	36
Xerox Corp.	58

Advertiser Index

*Denotes Section 2 Advertisers

Amdahl Corp.	41
American Power Conversion	7*
Arbor Software	13
BDM International Inc.	65
Business Objects Inc.	25*
CAP Gemini America Inc.	3*
CIO Communications Inc.	C3*, 14A*, 15*, 55*, 67
Computer Associates Intl. Inc.	C2*, 5, 61*
Computer Museum	53*
Data General Corp.	11*
Datalink	45
Dell Computer Corp.	C2
Deloitte & Touche LLP	11
EDS	29
Ernst & Young LLP	43
Exabyte Corp.	15
Exide Electronics	59
FileNet Corp.	5*
Fujifilm	27*
Gateway 2000 Inc.	8
IBM Corp.	C4, C4*, 19*
Intel Corp.	C3
Internet Travel Network	27
JBA	22*
Keane Inc.	45*
Kronos Inc.	25
Lucent Technologies	17*
MCI Telecommunications Corp.	59*
Mercury Interactive	47*
Microsoft Corp.	2, 34
Network + Interop	57*
Novell Inc.	22, 30*
Oracle Corp.	7
PDS	61
SAP America Inc.	49*
SAS Institute Inc.	21
Silicon Graphics Inc.	8*
SPSS Inc.	63
StorageTek	16
Sun Microsystems Inc.	19
Tivoli Systems Inc.	57
USWeb Corp.	51*
UUNET	13*
Viasoft Inc.	31
VisionTek	C2 Flap*, 33

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Maine Employers Mutual Insurance Co.'s Gary Baxter on Recruiting Remotely

CIO: Is it difficult to find the IS staff you need in Maine?

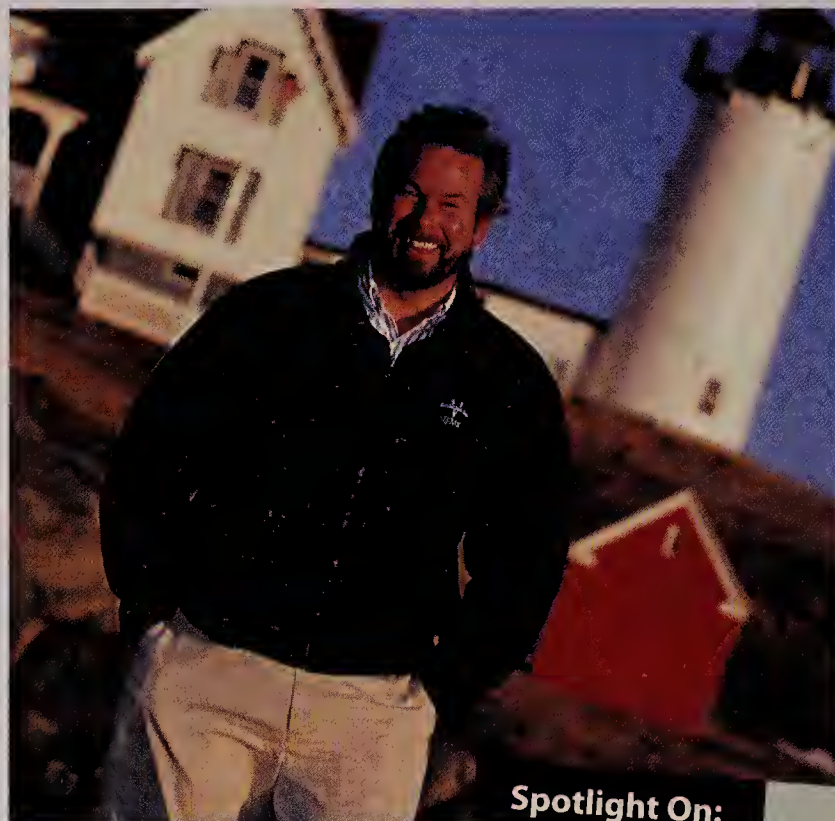
There's a real dearth of talented [IS] people in the marketplace. The population base in Portland is 65,000 people, so it's a tiny [IS] market. Yet, Portland is a dynamic community with a number of banks and insurance companies, so there is a strong need for technical IS people. Supply and demand just are not in sync.

How do you recruit the people you need?

We look for the "exiles" [Maine natives who've moved elsewhere] and see if we can get them to come back. We've got two people on our staff from Richmond, Va., who wanted to come back to Maine.

What sort of unique offerings can you dangle in front of prospective hires?

Mostly cultural. We don't run our IS organization like a traditional shop, which is both a plus and a minus. Rather than a traditional, hierarchical career path, we have two positions: the IS resource, who is



Spotlight On:

Gary Baxter, CIO, Maine Employers Mutual Insurance Co., a \$75 million, 165-employee enterprise located in Portland, Maine

- **Line of Business** Insurance
- **Bio** Has been CIO for the last year and a half; spent a decade developing and delivering custom software and consulting systems
- **Day to Day** Oversees company's IS organization, including choosing and adopting appropriate technologies to create and maintain competitive advantage, and is key member of senior management team
- **Challenges** Recruiting and retaining IS staff in a remote and competitive marketplace

basically a programmer, and the IS representative, who's essentially performing duties of a project manager/analyst/tester/customer liaison. The IS representative is assigned to a customer and manages that customer relationship and makes sure all the technical work gets done.

If these people have any desire to grow in areas outside their technical expertise, whether it's to learn more about the business or just how to deal better with people or manage projects, it's all right here.

We also play the "Maine card"—the slower pace, the lifestyle. That's a big one for people who are originally from here. Also, our company has a relaxed atmosphere. It's not a very corporate, hierarchical environment internally. We're an insurance company, but we're casually dressed 100 percent of the

time. That's not typical in the insurance industry.

What concerns do your potential recruits have?

One concern is whether they will have access to the bleeding-edge technologies available in larger marketplaces. The other is mar-

How do you allay that concern?

You can't, unless you have a confident person. If you're good at what you do, you can find a good position wherever you are. Also, the people we attract tend to move beyond the marketability issue because of all the other factors involved in moving to Maine—raising a family here, coming back to a family, doing the work.

How do you retain these people once you get them?

Basically, we treat them as human beings. We don't say, "You have to be here 42.5 hours a week; here are the hours." We say, "Here are the expectations; you manage your role." We have people who drive 70 or 80 miles to work, and if the weather's bad, they don't come to the office. They stay home to do their work.

We also pay pretty well. We have a core group of people whom we've identified as key [employees] because they've risen to the challenge. They've grown, and they've expanded, and we pay them more because we don't want to take any chances on losing those people—they're so hard to get.

—Tom Field

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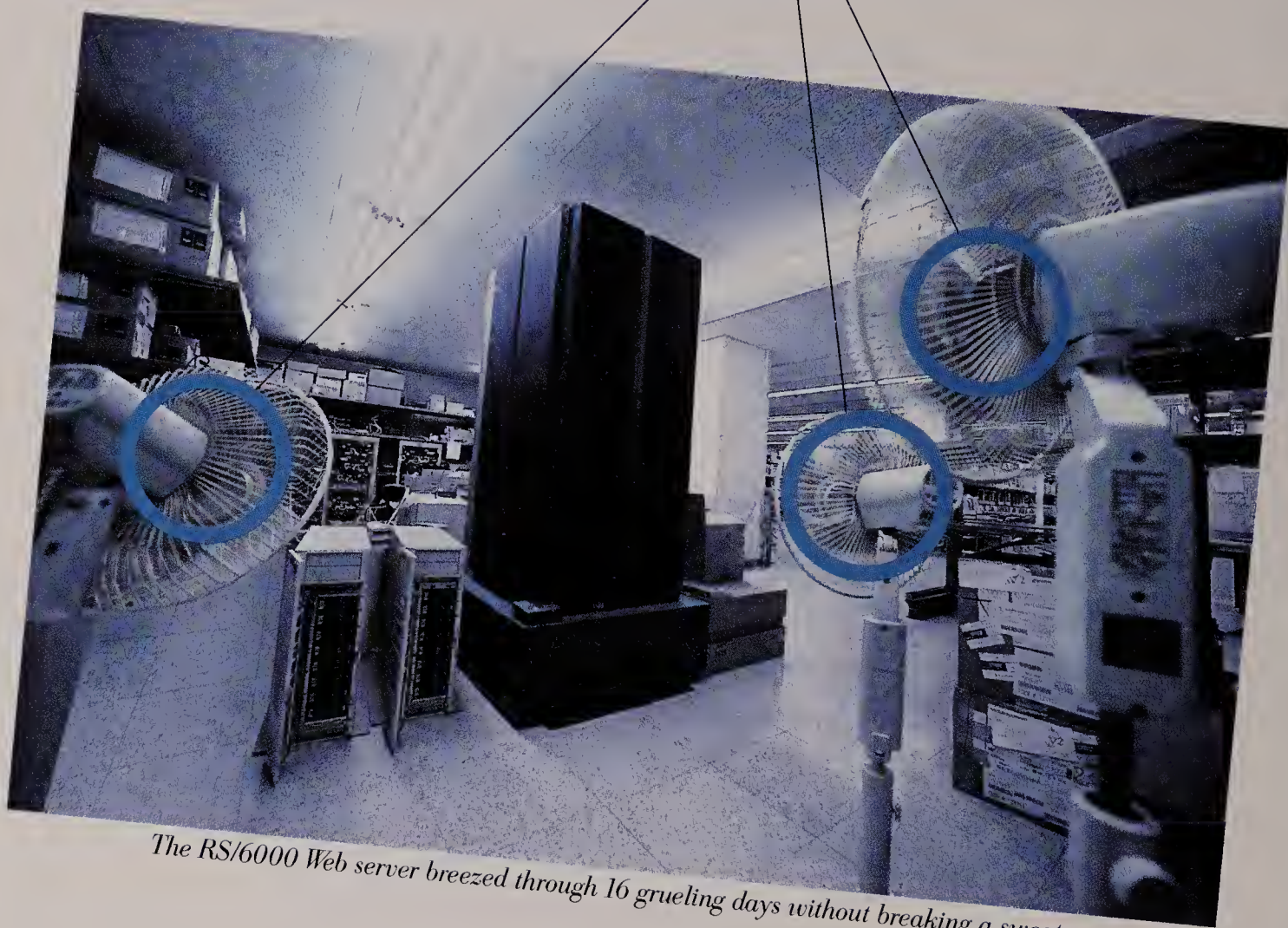
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